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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Ylitalo et al.	Examiner:	Berman S.
Serial No.:	09/911,279	Group Art Unit:	1711
Filed:	July 23, 2001	Docket:	56473US002
Title:	INK JET INK COMPOSITIONS		

CERTIFICATE UNDER 37 CFR 1.8:
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By: James D. Withers
Name: James D. Withers

Board of Patent Appeals and Interferences
Commissioner for Patents
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- ☒ Brief on Appeal
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Reg. No.: 40,376
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Patent
Docket No: 56473US002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Ylitalo et al.
Serial No.: 09/911,279
Filed: July 23, 2001

Group Art Unit: 1711
Examiner: S. Berman

For: INK JET INK COMPOSITIONS CONTAINING A FLUORINATED SURFACTANT

CERTIFICATE OF MAILING

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January 09, 2004 — Date

James D. Withers — James D. Withers

BRIEF ON APPEAL

Board of Patent Appeals and Interferences
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

This is an appeal from the Office Action mailed on July 22, 2003 finally rejecting claims 1-33.

This Brief is being filed in triplicate. The fee required under 37 CFR §1.17(c) for the appeal should be charged to Deposit Account No. 13-2725. Appellants request the opportunity for a personal appearance before the Board of Appeals to argue the issues of this appeal. The fee for the personal appearance will be timely paid upon receipt of the Examiner's Answer.

TABLE OF CONTENTS

REAL PARTY IN INTEREST

The real party in interest is Minnesota Mining and Manufacturing of St. Paul, Minnesota and its affiliate 3M Innovative Properties Company of St. Paul, Minnesota.

RELATED APPEALS AND INTERFERENCES

The assignee, the assignee's legal representatives, and the patent applicant submit that there are no related appeals or interferences that are directly affected by or have a bearing on the Board's decision in this appeal.

STATUS OF CLAIMS

Claims 1-33 are pending in the present application. Claims 1-33 were rejected in a Final Office Action dated July 22, 2003. Each of the rejected claims, claims 1-33, has been appealed. A clean copy of the pending claims is attached as an Appendix.

STATUS OF AMENDMENTS

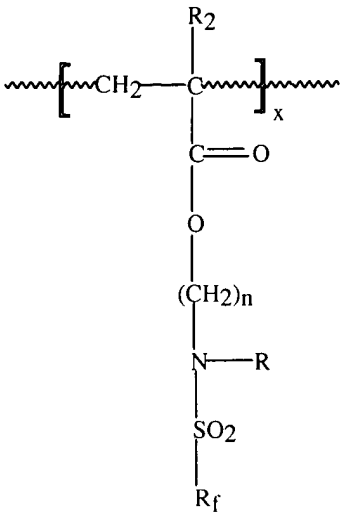
In response to a July 22, 2003 Final Office Action, an Amendment and Response was filed by Appellants on September 22, 2003. In an Advisory Action mailed on October 22, 2003, Examiner Berman entered the September 22, 2003 Amendment and Response for Appeal purposes.

SUMMARY OF THE INVENTION

The present invention is directed to ink jet ink compositions containing one or more "C4" fluorochemical surfactants. As used herein, the term "C4 fluorinated surfactants" refers to fluorochemical surfactants having four carbon atoms in the fluorinated moiety of the surfactant. Appellants were the first to discover that "C4 fluorinated surfactants" could be used in ink jet ink compositions and provide desirable properties to the resulting ink jet ink compositions without generating undesirable levels of foam. Applicants of the present invention were the first to use the specific C4 fluorinated surfactants in ink jet ink compositions and ink jetting methods. Further, Applicants of the present invention were the first to discover that specific C4 fluorinated surfactants were superior to known fluorinated surfactants because the specific C4 fluorinated surfactants did not generate foam as did the previously used and known fluorinated surfactants.

As discussed in the "Background of the Invention" section of Appellants' specification, fluorinated surfactants have been known as effective materials for providing desirable performance requirements and surface wetting characteristics. However, the problem of foaming in ink jet ink applications is still a problem when using known fluorinated surfactants. See Appellants' specification, from page 1, line 23 to page 2, line 12. Appellants' present invention addresses the problem of foam associated with known fluorinated surfactants in ink jet ink applications by the discovery that C4 fluorochemical sulfonamide surfactants may be used in ink jet ink applications to provide desirable performance requirements and surface wetting characteristics, such as known fluorinated surfactants, but without generating undesirable levels of foam as is common with known fluorinated surfactants.

In one embodiment of the present invention, the ink jet ink compositions comprise, *inter alia*, a colorant, a vehicle, and a fluorochemical surfactant, wherein the fluorochemical surfactant comprises one or more surfactants having one or more chemical structures selected from:



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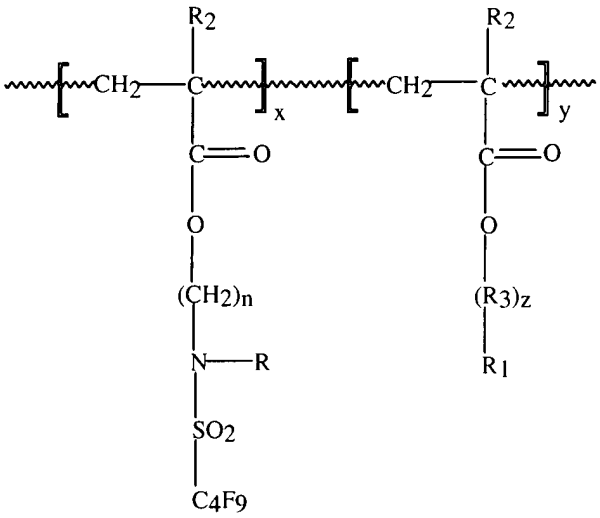

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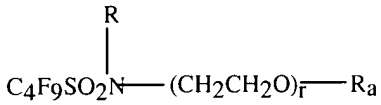
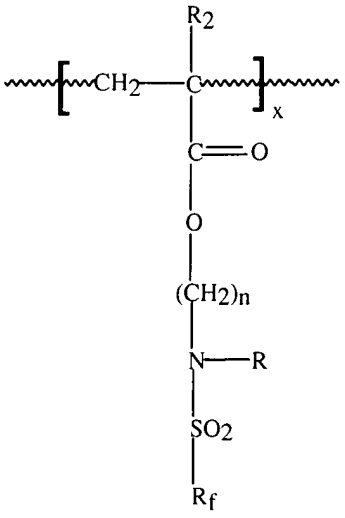
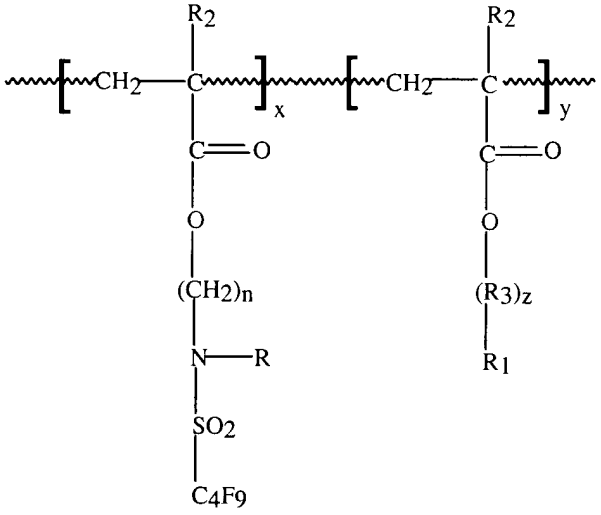


wherein ~~~~ represents a bond in a polymer chain; R_f is $-C_4F_9$ or $-C_3F_7$; R, R_1, R_2 and R_a are each independently hydrogen or alkyl groups having 1 to 4 carbon atoms; R_3 comprises one or more straight or branched polyalkylene-oxy groups having 2 to 6 carbon atoms in each group; n is an integer from 2 to 10; x, y and z are integers of at least 1; and r is an integer of 2 to 20.

In a further embodiment of the present invention, the ink jet ink composition comprises an ink jet printable, radiation curable composition. The radiation curable composition comprises, *inter alia*, a vehicle comprising a polymerizable material, a photoinitiator, and a

fluorochemical surfactant, wherein the fluorochemical surfactant comprises one or more surfactants having one or more chemical structures selected from:





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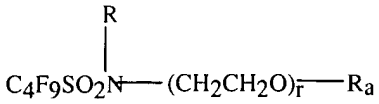


wherein ~~~~ represents a bond in a polymer chain; R_f is $-C_4F_9$ or $-C_3F_7$; R, R_1, R_2 and R_a are each independently hydrogen or alkyl groups having 1 to 4 carbon atoms; R_3 comprises one or more straight or branched polyalkylene-oxy groups having 2 to 6 carbon atoms in each group; n is an integer from 2 to 10; x, y and z are integers of at least 1; and r is an integer of 2 to 20. The radiation curable composition may or may not contain a colorant.

The present invention is even further directed to an article of manufacture comprising a substrate having one of the above-described ink jet ink compositions on a surface thereof. The substrate may comprise a variety of substrates including, but not limited to, wood, metal, paper, woven fabric, nonwoven fabric, leather, resin-coated paper, foil, a foam, a polymer film, single and multilayer nonporous polymer films, or a combination thereof. The substrate may further comprise a variety of materials including, but not limited to, the materials cited above, poly(vinyl chloride), polybutylene terephthalate, polyethylene terephthalate, acrylonitrile-butadiene-styrene copolymer, polystyrene, polycarbonate, polyurethane, epoxy, polyimide, polyamide, polymethyl (meth)acrylate, polyolefin, polyamideimide, polyacrylate, polyacrylamide, melamine resins, polyvinyl butyral and copolymers thereof, and combinations thereof. In one desired embodiment of the present invention, the substrate comprises a retroreflective article.

ISSUES ON APPEAL

The following issues are on appeal:

1) Whether claims 1-13, 18-21, 23 and 26-30 are unpatentable under 35 U.S.C. §103(a) in view of U.S. Patent No. 5,852,075 to Held (hereinafter, "Held") in combination with International Publication No. WO 01/30873 to Savu et al. (hereinafter, "Savu");

2) Whether claims 1-13, 18-23 and 26-30 are unpatentable under 35 U.S.C. §103(a) in view of European Patent Application No. 0974626 A1 to Pearlstine et al. (hereinafter, "Pearlstine") in combination with Savu;

3) Whether claims 1-17, 19-29 and 33 are unpatentable under 35 U.S.C. §103(a) in view of U.S. Patent No. 6,114,406 to Caiger et al. (hereinafter, "Caiger") in combination with Savu;

4) Whether claims 1-13, 15-23 and 26-30 are unpatentable under 35 U.S.C. §103(a) in view of U.S. Patent No. 5,863,320 to Breton et al. (hereinafter, "Breton") in combination with Savu;

5) Whether claims 1-13, 15-30 and 33 are unpatentable under 35 U.S.C. §103(a) in view of International Publication No. WO 99/07796 to Smith (hereinafter, "Smith") in combination with Savu; and

6) Whether claims 31-32 are unpatentable under 35 U.S.C. §103(a) in view of Smith, Held, Pearlstine, Caiger or Breton in combination with Savu, and further in view of U.S. Patent No. 6,113,679 to Adkins et al. (hereinafter, "Adkins").

GROUPING OF CLAIMS

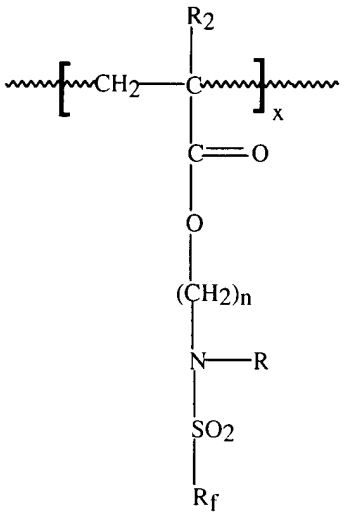
For the purpose of this Appeal, rejected claims 1-33 do not stand or fall together. Claim 1-33 are separately patentable for at least the reasons given below in the "Arguments" section.

ARGUMENTS OF APPELLANTS

Rejection of Claims 1-13, 18-21, 23 and 26-30 Under 35 U.S.C. §103(a) In View Of Held In Combination With Savu

Claims 1-13, 18-21, 23 and 26-30 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,852,075 to Held (hereinafter, "Held") in view of International Publication No. WO 01/30873 to Savu et al. (hereinafter, "Savu"). Reversal of this rejection is respectfully requested.

Appellants' claimed invention, as embodied in independent claim 1, is directed to an inkjet ink composition comprising, *inter alia*, a colorant; a vehicle; and a fluorochemical surfactant; wherein the fluorochemical surfactant comprises one or more surfactants having one or more chemical structures selected from:



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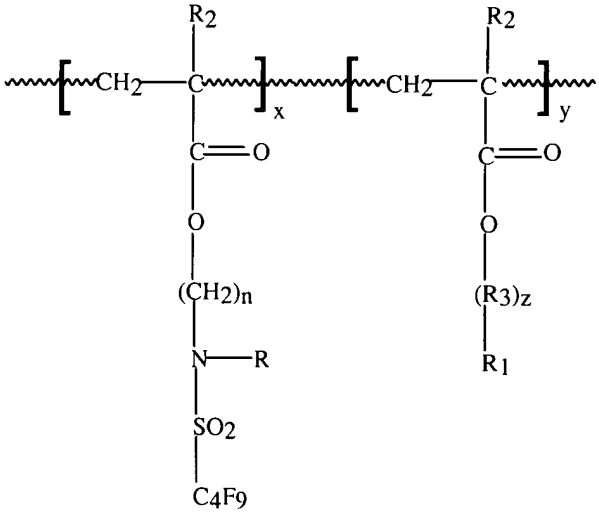

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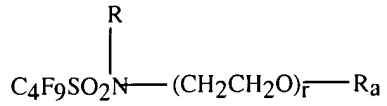


wherein ~~~~~ represents a bond in a polymer chain; R_f is $-C_4F_9$ or $-C_3F_7$; R, R_1, R_2 and R_a are each independently hydrogen or alkyl groups having 1 to 4 carbon atoms; R_3 comprises one or more straight or branched polyalkylene-oxy groups having 2 to 6 carbon atoms in each group; n is an integer from 2 to 10; x, y and z are integers of at least 1; and r is an integer of 2 to 20.

The teaching of Held relates to surfactant systems for ink jet ink compositions. Specifically, the teaching of Held relates to ink jet ink compositions containing a surfactant system, wherein the surfactant system *consists essentially of* (i) at least one siloxane surfactant, and (ii) at least one fluorinated surfactant of the formula $[R(f)Q]_nA$ wherein R(f) is a perfluoroalkyl group having 6 to 22 carbon atoms, Q is a divalent bridging group, A is a water soluble group, and n is 1 or 2. (Note that the disclosed fluorinated surfactants are from C6 to C22 fluorinated surfactants, not C4 fluorinated surfactants.)

The teaching of Held fails to teach or suggest an inkjet ink composition comprising one or more specific C4 fluorochemical surfactants as recited in Appellants' independent claim 1.

Examiner Berman relies on the teaching of Savu to allegedly cure the above-noted deficiencies in the disclosure of Held.

The teaching of Savu is directed to C4 fluorochemical sulfonamide surfactants. The disclosed fluorochemical sulfonamide surfactants are identical to those recited in Appellants' independent claim 1. In fact, the disclosure of Savu, which is assigned to The 3M Company, the assignee of the present application, is specifically incorporated by reference into the present application on page 13, lines 19-23 of Appellants' specification.

The teaching of Savu provides a variety of suitable applications for using the disclosed C4 fluorochemical sulfonamide surfactants; however, the teaching of Savu does not teach or suggest the use of the disclosed C4 fluorochemical sulfonamide surfactants in an ink jet ink composition. In fact, the teaching of Savu teaches away from the use of the disclosed C4 fluorochemical sulfonamide surfactants in ink jet applications due to their ability to form foam. As disclosed on page 22, lines 7-25, the teaching of Savu discloses the positive attributes of the disclosed C4 fluorochemical sulfonamide surfactants when used in the oil industry. Appellants respectfully submit that one of ordinary skill in the art given the teaching of Savu would not have expected the disclosed C4 fluorochemical sulfonamide surfactants to be suitable for use in

ink jet applications, and would not have been motivated to incorporate the disclosed C4 fluorochemical sulfonamide surfactants into an ink jet ink composition.

Examiner Berman suggests that one of ordinary skill in the art, given the teaching of Held, would have (1) realized that the teaching of Held had one or more shortcomings related to the disclosed surfactant system (i.e., C6 to C22 fluorinated surfactants), (2) sought out the teaching of Savu directed to foam-generating fluorinated surfactants, and (3) substituted one or more C4 fluorochemical sulfonamide surfactants from the teaching of Savu for the C6 to C22 fluorinated surfactant in the ink jet ink compositions of Held. Examiner Berman specifically states on page 3, lines 8-14 of the February 27, 2003 Office Action (paper no. 8):

> It would have been obvious to one skilled in the art to select a fluoroalcohol substituted monoether with polyethylene glycol as the fluorinated surfactant in the compositions disclosed by Held because Held uses a fluoroalcohol substituted monoether with polyethylene glycol in the examples (see Ink preparations 2, 3 and 4). It would further have been obvious to one skilled in the art to substitute a fluorochemical surfactant taught by WO'873 for the fluorinated surfactants containing a perfluoralkyl group and polyether groups taught by Held in the compositions disclosed by Held, with the expectation of providing similar or improved surfactant properties.

Appellants disagree.

Appellants respectfully submit that the teaching of Held fails to suggest to one of ordinary skill in the art the need to seek out the teaching of Savu, which is directed to applications other than ink jet ink technology. There is nothing in the teaching of Held to suggest to one of ordinary skill in the art the need to use a surfactant system other than the specific surfactant system disclosed in the teaching of Held. The teaching of Held is directed to a specific surfactant system *consisting essentially of* (i) a siloxane surfactant in combination with (ii) a C6 to C22 fluorinated surfactant. See, Held, column 4, lines 39-45, and from column 6, line 42 to column 7, line 47. Why would one of ordinary skill in the art want to modify the surfactant system of Held given the positive attributes of the disclosed surfactant system recited throughout the teaching of Held? (See, Held, column 1, line 66 to column 2, line 8).

Appellants further respectfully submit that the disclosure of Held fails to provide motivation to one skilled in the art to seek out fluorinated surfactants other than those specifically disclosed in the teaching of Held, namely, fluorinated surfactants having a formula $[R(f)Q]_nA$ wherein R(f) is a perfluoroalkyl group having 6 to 22 carbon atoms, Q is a divalent bridging group, A is a water soluble group, and n is 1 or 2. Certainly, the disclosure of Held does not provide motivation to one skilled in the art to substitute a C4 fluorochemical

sulfonamide surfactant as disclosed in Savu for the C6 to C22 fluorinated surfactants in the surfactant system disclosed in Held. In fact, the teaching of Held teaches away from such a substitution given that the teaching of Held specifically requires C6 to C22 fluorinated surfactants to be used in combination with the disclosed siloxane surfactant in order to produce the disclosed surfactant system.

It is not clear to Appellants why one of ordinary skill in the art would have modified the teaching of Held as proposed by Examiner Berman, namely, to substitute a C4 fluorochemical sulfonamide surfactant as disclosed in the teaching of Savu for a C6 to C22 fluorinated surfactant in the surfactant system disclosed in the teaching of Held. Appellants respectfully submit that the only motivation for such a modification of the teaching of Held has been gleaned from a review of Appellants' invention, not from what is being taught or suggested in the art.

For at least the reasons given above, Appellants respectfully submit that a *prima facie* case of obviousness has not been made, and that the combination of the teaching of Held with the teaching of Savu fails to make obvious Appellants' claimed invention as embodied in independent claim 1. Since claims 2-13, 18-21, 23 and 26-30 depend from independent claim 1, and recite additional claim features, Appellants respectfully submit that the combination of the teaching of Held with the teaching of Savu fails to make obvious claims 2-13, 18-21, 23 and 26-30.

It should be noted that the proposed combination of the teachings of Held and Savu, even if proper (and Appellants submit that the proposed combination is not proper), fails to teach or suggest the following claim features of dependent claims 21, 23 and 30:

(1) an ink jet ink composition as recited in independent claim 1, wherein the ink composition has a Foam Stability Test value of less than about 30% (claim 21); and

(2) an article of manufacture having the ink jet ink composition of independent claim 1 printed thereon, wherein the article comprises a component for an outdoor sign, a roadway, a motor vehicle, a boat, an aircraft, or furniture (claim 30).

For at least the reasons given above, it is respectfully submitted that the rejection of claims 1-13, 18-21, 23 and 26-30 under 35 U.S.C. §103(a) as being unpatentable over Held in view of Savu should be reversed.

Rejection of Claims 1-13, 18-23 and 26-30 Under 35 U.S.C. §103(a) In View Of Pearlstine In Combination With Savu

Claims 1-13, 18-23 and 26-30 stand rejected under 35 U.S.C. §103(a) as being unpatentable over European Patent Application No. 0974626 A1 to Pearlstine et al. (hereinafter, "Pearlstine") in view of Savu. Reversal of this rejection is respectfully requested.

A description of Appellants' claimed invention embodied in independent claim 1 and the teaching of Savu may be relied upon above.

The teaching of Pearlstine relates to ink jet ink compositions containing a siloxane surfactant or a fluorinated surfactant of the formula $[R(f)Q]_nA$ wherein R(f) is a perfluoroalkyl group having 6 to 22 carbon atoms, Q is a divalent bridging group, A is a water soluble group, and n is 1 or 2. It should be noted that the teaching of Pearlstine and the teaching of Held are both assigned to E.I. DuPont de Nemours and Company, and both disclose identical C6 to C22 fluorinated surfactants, which differ in structure from the C4 fluorochemical surfactants recited in Appellants' independent claim 1

Examiner Berman uses the same reasoning to combine the teaching of Pearlstine with the teaching of Savu and reject Appellants' claimed invention as embodied in independent claim 1. In particular, Examiner Berman suggests that one of ordinary skill in the art, given the teaching of Pearlstine, would have (1) realized that the teaching of Pearlstine had one or more shortcomings related to the disclosed surfactants (i.e., the C6 to C22 fluorinated surfactant), (2) sought out the teaching of Savu, and (3) substituted one or more C4 fluorochemical sulfonamide surfactants from the teaching of Savu for the C6 to C22 fluorinated surfactant within the disclosure of Pearlstine.

Appellants respectfully submit that the teaching of Pearlstine fails to teach or suggest to one of ordinary skill in the art the need to seek out fluorochemical surfactants other than those disclosed in the teaching of Pearlstine. The teaching of Pearlstine is directed to specific C6 to C22 fluorinated surfactants. Further, the teaching of Pearlstine specifically discloses preferred fluorochemical surfactants having from 6 to 16 carbon atoms in the fluorinated moiety. See, Pearlstine, page 6, Table 1. There simply is no suggestion in the teaching of Pearlstine that would have led one skilled in the art to the teaching of Savu and the specific C4 fluorochemical surfactants disclosed therein. Even if one of ordinary skill in the art would have been led to the teaching of Savu (which Appellants submits is not the case), one of ordinary skill in the art, given the teaching of Savu directed to foam-generating fluorinated surfactants, would not have incorporated such foam-generating fluorinated surfactants into an ink jet ink composition

Appellants further respectfully submit that the teaching of Pearlstine fails to provide motivation to one skilled in the art to seek out fluorinated surfactants other than those specifically disclosed in the teaching of Pearlstine, namely, fluorinated surfactants having a formula $[R(f)Q]_nA$ wherein R(f) is a perfluoroalkyl group having 6 to 22 carbon atoms, Q is a divalent bridging group, A is a water soluble group, and n is 1 or 2. Certainly, the teaching of Pearlstine does not provide motivation to one skilled in the art to substitute a foam-generating C4 fluorochemical sulfonamide surfactant as disclosed in the teaching of Savu for a C6 to C22 fluorinated surfactant disclosed in the teaching of Pearlstine.

It is not clear to Appellants why one of ordinary skill in the art would have modified the teaching of Pearlstine as proposed by Examiner Berman, namely, to substitute a C4 fluorochemical sulfonamide surfactant as disclosed in the teaching of Savu for a C6 to C22 fluorinated surfactant disclosed in the teaching of Pearlstine. Appellants respectfully submit that the only motivation for such a modification of the teaching of Pearlstine has been gleaned from a review of Appellants' invention, not from what is being taught or suggested in the art.

For at least the reasons given above, Appellants respectfully submit that a *prima facie* case of obviousness has not been made, and that the combination of the teaching of Pearlstine with the teaching of Savu fails to make obvious Appellants' claimed invention as embodied in independent claim 1. Since claims 2-13, 18-23 and 26-30 depend from independent claim 1, and recite additional claim features, Appellants respectfully submit that the combination of the teaching of Pearlstine with the teaching of Savu fails to make obvious claims 2-13, 18-23 and 26-30.

It should be noted that the proposed combination of the teachings of Pearlstine and Savu, even if proper (and Appellants submit that the proposed combination is not proper), fails to teach or suggest the following claim features of dependent claims 21 and 30:

(1) an ink jet ink composition as recited in independent claim 1, wherein the ink composition has a Foam Stability Test value of less than about 30% (claim 21); and

(2) an article of manufacture having the ink jet ink composition of independent claim 1 printed thereon, wherein the article comprises a component for an outdoor sign, a roadway, a motor vehicle, a boat, an aircraft, or furniture (claim 30).

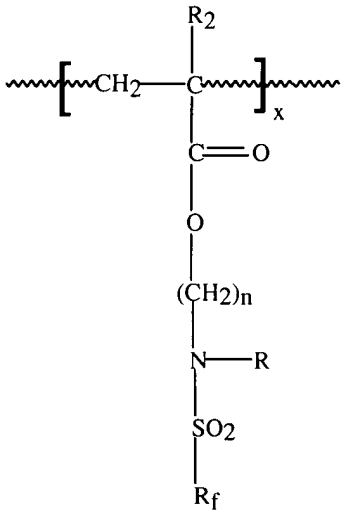
For at least the reasons given above, it is respectfully submitted that the rejection of claims 1-13, 18-23 and 26-30 under 35 U.S.C. §103(a) as being unpatentable over Pearlstine in view of Savu should be reversed.

Rejection of Claims 1-17, 19-29 and 33 Under 35 U.S.C. §103(a) In View Of Caiger In Combination With Savu

Claims 1-17, 19-29 and 33 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,114,406 to Caiger et al. (hereinafter, "Caiger") in view of Savu. Reversal of this rejection is respectfully requested.

A description of Appellants' claimed invention embodied in independent claim 1 and the teaching of Savu may be relied upon above.

Appellants' claimed invention, as embodied in independent claim 33, is directed to an ink jet printable radiation curable composition comprising, *inter alia*, a vehicle comprising a polymerizable material; a photoinitiator; and a fluorochemical surfactant; wherein no colorant is present; and further wherein the fluorochemical surfactant comprises one or more surfactants having one or more chemical structures selected from:



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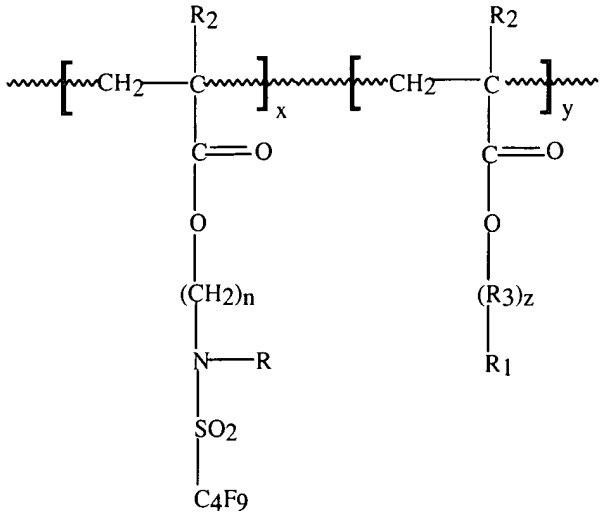

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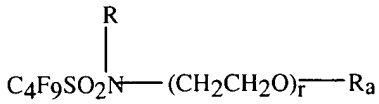


wherein ~~~~ represents a bond in a polymer chain; R_f is $-C_4F_9$ or $-C_3F_7$; R, R_1, R_2 and R_a are each independently hydrogen or alkyl groups having 1 to 4 carbon atoms; R_3 comprises one or more straight or branched polyalkylene-oxy groups having 2 to 6 carbon atoms in each group; n is an integer from 2 to 10; x, y and z are integers of at least 1; and r is an integer of 2 to 20.

The teaching of Caiger relates to radiation curable ink compositions containing a polyfunctional alkoxylated and/or polyfunctional polyalkoxylated acrylate monomer material, and a photoinitiator. The disclosed compositions may also include non-alkoxylated radiation curable monomers, surfactants, photoinitiator stabilizers, etc. The teaching of Caiger discloses the use of a C8 fluorinated surfactant, FLUORAD 430, in column 3, lines 52-55.

The teaching of Caiger fails to teach or suggest an inkjet ink composition comprising one or more specific C4 fluorochemical surfactants as recited in Appellants' independent claim 1.

Examiner Berman relies on the teaching of Savu to allegedly cure the above-noted deficiencies in the teaching of Caiger.

Examiner Berman suggests that one of ordinary skill in the art, given the teaching of Caiger, would have (1) realized that the teaching of Caiger had one or more shortcomings related to surfactants (i.e., C8 fluorinated surfactants), (2) sought out the teaching of Savu, and (3) substituted one or more C4 fluorochemical sulfonamide surfactants from the teaching of

Savu for the C8 fluorinated surfactant disclosed in the teaching of Caiger. Examiner Berman specifically states on page 3, lines 8-14 of the February 27, 2003 Office Action (paper no. 8):

> It would have been obvious to one skilled in the art to employ the fluorochemical surfactants taught by WO'873 as the fluoro surfactant in the ink compositions disclosed in Caiger et al. Caiger et al. teach that the surfactant is preferably a nonionic surfactant and a fluoro surfactant, thus providing motivation to employ nonionic fluorosurfactants in the disclosed ink compositions.

Appellants disagree.

Appellants respectfully submit that the teaching of Caiger fails to provide motivation to one skilled in the art to seek out the teaching of Savu, and especially, the specific C4 fluorochemical sulfonamide surfactants disclosed in the teaching of Savu. The disclosure of Caiger already discloses suitable fluoro surfactants, such as the C8 surfactant FLUORAD FC430, for use in the ink compositions disclosed in Caiger. See, Caiger, column 3, lines 52-55. It is not clear to Appellants why one of ordinary skill in the art would have (i) sought out the teaching of Savu and (ii) replaced an acceptable C8 fluoro surfactant as disclosed in the teaching of Caiger with a specific C4 fluorochemical sulfonamide surfactant disclosed in the teaching of Savu. Appellants respectfully submit that the only motivation for such an alteration of the teaching of Caiger has been gleaned from a review of Appellants' invention, not from what is being taught or suggested in the art.

For at least the reasons given above, Appellants respectfully submit that a *prima facie* case of obviousness has not been made, and that the combination of the teaching of Caiger with the teaching of Savu fails to make obvious Appellants' claimed invention as embodied in independent claims 1 and 33. Since claims 2-17 and 19-29 depend from independent claim 1, and recite additional claim features, Appellants respectfully submit that the combination of the teaching of Caiger with the teaching of Savu fails to make obvious claims 2-17 and 19-29.

It should be noted that the proposed combination of the teachings of Caiger and Savu, even if proper (and Appellants submit that the proposed combination is not proper), fails to teach or suggest the following claim features of dependent claims 21 and 29:

(1) an ink jet ink composition as recited in independent claim 1, wherein the ink composition has a Foam Stability Test value of less than about 30% (claim 21); and

(2) an article of manufacture having the ink jet ink composition of independent claim 1 printed thereon, wherein the article comprises single and multilayer constructions of paper,

cardboard, non-woven fabric, woven fabric, leather, microporous film, and combinations thereof (claim 29).

For at least the reasons given above, it is respectfully submitted that the rejection of claims 1-17, 19-29 and 33 under 35 U.S.C. §103(a) as being unpatentable over Caiger in view of Savu should be reversed.

Rejection of Claims 1-13, 15-23 and 26-30 Under 35 U.S.C. §103(a) In View Of Breton In Combination With Savu

Claims 1-13, 15-23 and 26-30 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,863,320 to Breton et al. (hereinafter, "Breton") in view of Savu. Reversal of this rejection is respectfully requested.

A description of Appellants' claimed invention embodied in independent claim 1 and the disclosure of Savu may be relied upon above.

The teaching of Breton relates to ink compositions containing a perfluorosurfactant.

The teaching of Breton fails to teach or suggest an inkjet ink composition comprising one or more specific C4 fluorochemical surfactants as recited in Appellants' independent claim 1.

Examiner Berman relies on the teaching of Savu to allegedly cure the above-noted deficiencies in the teaching of Breton.

Examiner Berman suggests that one of ordinary skill in the art, given the teaching of Breton, would have (1) realized that the teaching of Breton had one or more shortcomings related to the disclosed perfluorosurfactants, (2) sought out the teaching of Savu, and (3) substituted one or more fluorochemical sulfonamide surfactants from the teaching of Savu for the perfluorosurfactant in the ink compositions of Breton. Examiner Berman specifically states on page 6, lines 1-5 of the February 27, 2003 Office Action (paper no. 8):

> It would have been obvious to one skilled in the art to employ the fluorochemical surfactants taught by WO'873 as the perfluorosurfactant in the ink compositions disclosed by Breton et al. Breton et al. teach that the surfactant is preferably a perfluorooctanesulfonamide ethylacrylate, thus providing motivation to employ perfluoro- sulfonamide ethylacrylate fluorosurfactants in the disclosed ink compositions.

Appellants disagree.

Appellants respectfully submit that the disclosure of Breton fails to provide motivation to one skilled in the art to seek out the teaching of Savu, and especially, the specific fluorochemical sulfonamide surfactants disclosed in the teaching of Savu. The disclosure of

Breton discloses suitable perfluorosurfactants, such as perfluorooctanesulfonamide ethylacrylate, for use in the disclosed ink compositions. It is not clear to Appellants why one of ordinary skill in the art, given the teaching of Breton, would have (i) sought out the teaching of Savu and (ii) replaced one of the acceptable perfluorosurfactant as disclosed in the teaching of Breton with a specific C4 fluorochemical sulfonamide surfactant disclosed in the teaching of Savu. Appellants respectfully submit that the only motivation for such an alteration of the teaching of Breton has been gleaned from a review of Appellants' invention, not from what is being taught or suggested in the art.

For at least the reasons given above, Appellants respectfully submit that a *prima facie* case of obviousness has not been made, and that the combination of the teaching of Breton with the teaching of Savu fails to make obvious Applicants' claimed invention as embodied in independent claim 1. Since claims 2-13, 15-23 and 26-30 depend from independent claim 1, and recite additional claim features, Appellants respectfully submit that the combination of the teaching of Breton with the teaching of Savu fails to make obvious claims 15-23 and 26-30.

It should be noted that the proposed combination of the teachings of Breton and Savu, even if proper (and Appellants submit that the proposed combination is not proper), fails to teach or suggest the following claim features of dependent claims 15-17, 21 and 30:

(1) an ink jet ink composition as recited in independent claim 1, wherein the vehicle of the ink composition comprises a polymerizable material (claim 15);

(2) an ink jet ink composition as recited in claim 15, wherein the polymerizable material is free-radically polymerizable (claim 16);

(3) an ink jet ink composition as recited in claim 16, wherein the free-radically polymerizable material comprises at least one of an acrylate monomer and an acrylate oligomer (claim 17);

(4) an ink jet ink composition as recited in independent claim 1, wherein the ink composition has a Foam Stability Test value of less than about 30% (claim 21); and

(5) an article of manufacture having the ink jet ink composition of independent claim 1 printed thereon, wherein the article comprises a component for an outdoor sign, a roadway, a motor vehicle, a boat, an aircraft, or furniture (claim 30).

For at least the reasons given above, it is respectfully submitted that the rejection of claims 1-13, 15-23 and 26-30 under 35 U.S.C. §103(a) as being unpatentable over Breton in view of Savu should be reversed.

Rejection of Claims 1-13, 15-30 and 33 Under 35 U.S.C. §103(a) In View Of Smith In Combination With Savu

Claims 1-13, 15-30 and 33 stand rejected under 35 U.S.C. §103(a) as being unpatentable over International Publication No. WO 99/07796 to Smith (hereinafter, "Smith") in view of Savu. Reversal of this rejection is respectfully requested.

A description of Appellants' claimed invention embodied in independent claims 1 and 33, and the teaching of Savu may be relied upon above.

The teaching of Smith relates to ink compositions containing a fluorinated surfactant. The teaching of Smith discloses the use of FLUORAD FC129 (a C8 fluorinated surfactant) throughout the examples.

The teaching of Smith fails to teach or suggest an inkjet ink composition comprising one or more specific C4 fluorochemical surfactants as recited in Appellants' independent claim 1.

Examiner Berman relies on the teaching of Savu to allegedly cure the above-noted deficiencies in the teaching of Smith.

Examiner Berman suggests that one of ordinary skill in the art, given the teaching of Smith, would have (1) realized that the teaching of Smith had one or more shortcomings related to the disclosed C8 fluorinated surfactants, (2) sought out the teaching of Savu, and (3) substituted one or more C4 fluorochemical sulfonamide surfactants from the teaching of Savu for the C8 fluorinated surfactant within the disclosure of Smith. Appellants disagree.

Appellants respectfully submit that the teaching of Smith fails to provide motivation to one skilled in the art to seek out the teaching of Savu, and especially, the specific C4 fluorochemical sulfonamide surfactants disclosed in the teaching of Savu. The disclosure of Smith discloses a suitable C8 fluorinated surfactant for use in the ink compositions of Smith. It is not clear to Appellants why one of ordinary skill in the art would have (i) sought out the teaching of Savu and (ii) replaced one of the acceptable fluorinated surfactants as disclosed in the teaching of Smith with a specific fluorochemical sulfonamide surfactant disclosed in the teaching of Savu. Appellants respectfully submit that the only motivation for such an alteration of the teaching of Smith has been gleaned from a review of Appellants' invention, not from what is being taught or suggested in the art.

Further, in regard to independent claim 33, it should be noted that the disclosure of Smith does not suggest to one of skill in the art to remove the colorant disclosed in each of the ink compositions of Smith.

For at least the reasons given above, Appellants respectfully submit that a *prima facie* case of obviousness has not been made, and that the combination of the teaching of Smith with the teaching of Savu fails to make obvious Appellants' claimed invention as embodied in independent claim 1. Since claims 2-13 and 15-30 depend from independent claim 1, and recite additional claim features, Appellants respectfully submit that the combination of the teaching of Smith with the teaching of Savu fails to make obvious claims 2-13 and 15-30.

It should be noted that the proposed combination of the teachings of Breton and Savu, even if proper (and Appellants submit that the proposed combination is not proper), fails to teach or suggest the following claim features of dependent claims 15-17, 21 and 30:

(1) an ink jet ink composition as recited in independent claim 1, wherein the ink composition has a Foam Stability Test value of less than about 30% (claim 21); and

(2) an article of manufacture having the ink jet ink composition of independent claim 1 printed thereon, wherein the article comprises a component for an outdoor sign, a roadway, a motor vehicle, a boat, an aircraft, or furniture (claim 30).

For at least the reasons given above, it is respectfully submitted that the rejection of claims 1-13, 15-30 and 33 under 35 U.S.C. §103(a) as being unpatentable over Smith in view of Savu should be reversed.

Rejection of Claims 31-32 Under 35 U.S.C. §103(a) In View Of Smith, Held, Pearlstine, Caiger or Breton In Combination With Savu and Further In View Of Adkins

Claims 31-32 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Smith, Held, Pearlstine, Caiger or Breton in view of Savu, and further in view of U.S. Patent No. 6,113,679 to Adkins et al. (hereinafter, "Adkins"). Reversal of this rejection is respectfully requested.

A description of Appellants' claimed invention embodied in independent claim 1, and the teachings of Smith, Held, Pearlstine, Caiger, Breton and Savu may be relied upon above.

Claims 31-32 are directed to a retroreflective article containing a substrate comprises polymethyl methacrylate having printed thereon the ink jet ink composition of independent claim 1. Appellants respectfully submit that claims 31-32 are patentable over the disclosures of Smith, Held, Pearlstine, Caiger, Breton and Savu for at least the reasons given above with regard to independent claim 1. Appellants further respectfully submit that claims 31-32 are patentable over any combination of the teachings of Smith, Held, Pearlstine, Caiger, and Breton with the teaching of Savu and further with the teaching of Adkins for at least the following reasons.

The teachings of Smith, Held, Pearlstine, Caiger, Breton and Savu fail to teach or suggest a retroreflective article having a substrate comprises polymethyl methacrylate and an inkjet ink composition thereon, wherein the inkjet ink composition comprises one or more specific C4 fluorochemical surfactants as recited in Appellants' independent claim 1. Examiner Berman relies on the teaching of Adkins to allegedly cure the above-noted deficiencies in the teachings of Smith, Held, Pearlstine, Caiger, Breton and Savu.

Examiner Berman suggests that one of ordinary skill in the art, given any one of the teachings of Smith, Held, Pearlstine, Caiger and Breton, would have (1) realized that the teaching of Smith, Held, Pearlstine, Caiger, or Breton had one or more shortcomings related to the disclosed C6 to C22 fluorinated surfactants, (2) sought out the teaching of Savu, (3) substituted one or more C4 fluorochemical sulfonamide surfactants from the teaching of Savu for the C6 to C22 fluorinated surfactants within the ink jet ink compositions disclosed in the teachings of Smith, Held, Pearlstine, Caiger and Breton to form a new C4 fluorochemical sulfonamide surfactant-containing ink jet ink composition, and then (4) sought out the teaching of Adkins for a retroreflective substrate on which to apply the new C4 fluorochemical sulfonamide surfactant-containing ink jet ink composition. Appellants disagree.

As discussed above, it is not clear to Appellants why one of ordinary skill in the art, given any one of the teachings of Smith, Held, Pearlstine, Caiger and Breton, would have modified the ink compositions disclosed in the teachings of Smith, Held, Pearlstine, Caiger and Breton as proposed by Examiner Berman (i.e., to substitute a C4 fluorochemical sulfonamide surfactant for a C6 to C22 fluorinated surfactant). Further, it is not clear to Appellants why one of ordinary skill in the art, given any one of the teachings of Smith, Held, Pearlstine, Caiger and Breton and the teaching of Savu (assuming that one of ordinary skill in the art would have been lead to the teaching of Savu), would have sought out a specific substrate, such as a retroreflective substrate, as disclosed in the teaching of Adkins. Appellants respectfully submit that the only motivation for such a modification of the teachings of Smith, Held, Pearlstine, Caiger, Breton, Savu and Adkins has been deemed from a review of Appellants' invention, not from what is being taught or suggested in the art.

For at least the reasons given above, Appellants respectfully submit that a *prima facie* case of obviousness has not been made, and that the combination of any of the teachings of Smith, Held, Pearlstine, Caiger and Breton with the teaching of Savu, and further with the teaching of Adkins, fails to make obvious Appellants' claimed invention as embodied in claims 31-32.

For at least the reasons given above, it is respectfully submitted that the rejection of claims 31-32 under 35 U.S.C. §103(a) as being unpatentable over Smith, Held, Pearlstine, Caiger and Breton with the teaching of Savu, and further with the teaching of Adkins should be reversed.

Response To Appellant's Arguments

In the final Office Action mailed on July 22, 2003 (paper no. 13), Examiner Berman maintains the position that one of ordinary skill in the art would have been motivated to (i) seek out the teaching of Savu, and (ii) modify the disclosed ink jet ink compositions in the teachings of Held, Pearlstine, Caiger, Breton and Smith by substituting a C4 fluorinated surfactants as disclosed in the teaching of Savu for a C6 to C22 fluorinated surfactants as disclosed in the teachings of Held, Pearlstine, Caiger, Breton and Smith. Examiner Berman specifically states on page 2, lines 4-7 of the July 22, 2003 Office Action (paper no. 13):

> Applicant argues that the primary references do not provide motivation to substitute other surfactants for those disclosed. This argument is not persuasive *because each of the primary references teaches using perfluorinated surfactants in ink jet ink compositions, thus providing motivation to employ perfluorinated surfactants in the disclosed ink compositions*. (Emphasis added.)

Appellants have argued, and continue to argue, that none of the teachings of Held, Pearlstine, Caiger, Breton and Smith suggest to one of ordinary skill in the art or provide motivation to one of ordinary skill in the art to substitute the specific C4 fluorinated surfactants disclosed in the teaching of Savu for the surfactant systems disclosed in the teachings of Held, Pearlstine, Caiger, Breton and Smith. Appellants have not argued, and do not presently argue, that the teachings of Held, Pearlstine, Caiger, Breton and Smith fail to suggest to one of ordinary skill in the art or provide motivation to one of ordinary skill in the art to use C6 to C22 fluorinated surfactants, only that the teachings of Held, Pearlstine, Caiger, Breton and Smith fail to suggest to one of ordinary skill in the art or provide motivation to one of ordinary skill in the art to use C4 fluorinated surfactants. Applicants have noted above that each of the teachings of Held, Pearlstine, Caiger, Breton and Smith disclose surfactant systems for ink jet ink compositions, wherein the disclosed surfactant systems comprise (i) fluorinated surfactants containing a fluorinated alkyl group having from 6 to 22 carbon atoms, (ii) siloxane surfactants, or (iii) a combination thereof. However, the teachings of Held, Pearlstine, Caiger, Breton and Smith do not teach or suggest the use of specific C4 fluorinated surfactants as featured in Appellants' claimed invention.

Examiner Berman further argues that one of ordinary skill in the art would have been motivated to seek out the teaching of Savu, and substitute the C4 surfactants of Savu into the ink jet ink compositions disclosed in the teachings of Held, Pearlstine, Caiger, Breton and Smith by stating on page 2, lines 7-15 of the July 22, 2003 Office Action (paper no. 13):

> Savu et al teach perfluorinated surfactants considered to be analogous in structure and having the same function as the surfactants disclosed by the primary references. Savu et al specifically teach that surfactants derived from perfluorobutanesulfonyl fluoride have surface activities that surprisingly rival the surface activities of homologs made from perfluorooctane segments such as perfluorooctanesulfonyl fluoride (page 2, lines 13-16). Thus, one of ordinary skill in the art at the time of the invention would have been motivated to substitute that surfactants containing perfluorobutanesulfonyl groups for surfactants containing perfluorooctanesulfonyl groups by a reasonable expectation of successfully providing an ink jet ink and also by an expectation of providing the advantageous surface activities taught by Savu et al.

Appellants disagree that the teaching of Savu discloses "perfluorinated surfactants considered to be analogous in structure and having the same function as the surfactants disclosed by the primary references" as stated by Examiner Berman. The teaching of Savu clearly distinguishes perfluorobutanesulfonyl surfactants from other fluorinated surfactants by (i) the chemical structure of the surfactants, and (ii) the chemical properties of the disclosed surfactants. More importantly, there is no suggestion in the teaching of Savu that the disclosed surfactants are "analogous in structure" or "have the same function" as surfactants disclosed in the primary references, namely, the teachings of Held, Pearlstine, Caiger, Breton and Smith. It is important to note that any comparison of one surfactant with another surfactant in the teaching of Savu is not comparing the use of one surfactant in an ink jet ink composition versus the use of another surfactant in an ink jet ink composition. As discussed above, and central to Appellants' arguments, is the fact that the teaching of Savu is not concerned with ink jet ink compositions, surfactants for use in ink jet ink compositions, or chemical properties of surfactants for use in ink jet ink compositions.

Appellants want to be clear about the arguments made with regard to the proposed combination of any one of the teachings of Held, Pearlstine, Caiger, Breton and Smith with the teaching of Savu. First, Appellants respectfully submit that one of ordinary skill in the art would not have sought out the teaching of Savu, which is not directed to the art of ink jet ink technology, given any one of the teachings of Held, Pearlstine, Caiger, Breton and Smith, which are directed to the art of ink jet ink technology. As stated in Appellants' May 27, 2003

Amendment and Response (paper no. 12), it is not clear to Appellants why one of ordinary skill in the art would have sought out the teaching of Savu when the teaching of Savu is outside the scope of the art of ink jet ink technology. That is the first question that must be asked when analyzing Examiner Berman's proposed combination of references. Second, what does the teaching of Savu suggest to one of ordinary skill in the art of ink jet ink technology?

Even if one of ordinary skill in the art of ink jet ink technology was directed to the teaching of Savu, why would one of ordinary skill in the art substitute a foam-generating surfactant as disclosed in the teaching of Savu into an ink jet ink composition of Held, Pearlstine, Caiger, Breton or Smith knowing that the generation of foam in ink jet ink compositions is a serious problem in the art of ink jet ink technology? Appellants respectfully submit that one of ordinary skill in the art, given the disclosure of Savu, would have been directed away from such a substitution given that the teaching of Savu highlights the generation of foam using the disclosed surfactants. Again, the only motivation for substituting a surfactant, such as those disclosed in the teaching of Savu, for the surfactants disclosed in the ink jet ink compositions of Held, Pearlstine, Caiger, Breton and Smith has been gleaned from a review of Applicants' invention, not from what is being taught or suggested in the art of record.

As discussed in Appellants' May 27, 2003 Amendment and Response (paper no. 12), the disclosure of Savu teaches away from the use of the disclosed fluorochemical sulfonamide surfactants in ink jet ink applications due to their ability to generate foam. It is well known in the art of ink jet ink technology that components are not added to ink jet ink compositions in order to produce foam. On the contrary, antifoam additives are a common additive to, and are usually a necessary additive to ink jet ink compositions so as to minimize the generation of foam during storage, handling and jetting of ink jet ink compositions. As disclosed on page 22, lines 7-25, the teaching of Savu discloses the positive attributes of the disclosed fluorochemical sulfonamide surfactants, namely, the ability to form a stable foam, when used in the oil industry. (Appellants further note independent claim 69 of Savu directed to a method of forming a stable foam.)

Examiner Berman maintains that the teaching of Savu does suggest the use of the disclosed surfactants in ink jet ink compositions. Addressing Appellants' argument that the teaching of Savu actually teaches away from the use of the disclosed surfactants in ink jet ink compositions, Examiner Berman states on page 2, lines 17-23 of the July 22, 2003 Office Action (paper no. 13):

> This argument is not persuasive because Savu et al teach that the disclosed surfactants are advantageous to use in place of homologs made from perfluorooctane segments such as perfluorooctanesulfonyl fluoride (POSF) (page 2, lines 13-25). Several methods of use are taught, including oil well stimulation additives and coating additives in coating applications, wetting agents or additives in photoresists, and leveling agents for resist inks and other inks (page 25, lines 17-27). Thus, although ink jet inks are not specifically mentioned, use in ink formulations is clearly suggested.

As stated above, the teaching of Savu compares the use of perfluorobutanesulfonyl-containing surfactants with perfluorooctanesulfonyl fluoride (POSF) surfactants in compositions **other than ink jet ink compositions**. Examiner Berman acknowledges that the teaching of Savu fails to teach or suggest ink jet ink compositions; however, Examiner Berman maintains that the disclosure of Savu suggests to one of ordinary skill in the art of ink jet ink technology that perfluorobutanesulfonyl-containing surfactants would provide desired properties in ink jet ink compositions such as those disclosed in the teachings of Held, Pearlstine, Caiger, Breton and Smith. Appellants disagree for at least the reasons given above.

It should be noted that the teaching Savu teaches the use of C4 fluorochemical sulfonamide surfactants in specific ink compositions, namely, "resist inks for electronics and semiconductors," "inks such as gravure coat, screen print and thermal print" inks, and "pen inks." See, Savu, page 25, lines 17-27. Clearly, the teaching of Savu does not teach or suggest ink jet inks, which differ substantially from the above-mentioned inks in both ink composition components and methods of applying the inks.

In Appellants' May 27, 2003 Amendment and Response (paper no. 12), Appellants respectfully submitted that one of ordinary skill in the art of ink jet ink technology would not have expected the foam-generating surfactants disclosed in the teaching of Savu to be suitable for use in ink jet ink compositions such as those disclosed in the teachings of Held, Pearlstine, Caiger, Breton and Smith. In response, Examiner Berman states on page 3, lines 1-8 of the July 22, 2003 Office Action (paper no. 13):

> Applicant argues that the surfactants taught by Savu et al would not have been expected to be suitable for use in ink jet applications due to their ability to form foam. This argument is not persuasive because the example given by Savu et al of foam stability involves adding heptane to an acrylate composition to obtain a stable sea water foam upon shaking. Savu et al do not teach or suggest that the disclosed surfactants will cause foaming of ink compositions. One of ordinary skill in the art at the time the invention would not have been motivated to obtain a foam in a ink jet ink composition in the absence of foaming agent. Savu et al do not teach

> or suggest foaming other kinds of compositions than those in Examples 52-56.

Examiner Berman seems to be suggesting that the teaching of Savu only discloses the foam-generating property of the disclosed surfactants in connection with a heptane-containing solution. Appellants disagree. Appellants note that independent claim 69 of Savu is directed to a method of generating a stable foam comprising, *inter alia*, adding one of the disclosed surfactants to a "water or an aqueous dispersion or solution," not a heptane-containing solution.

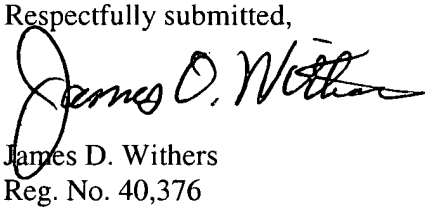
For at least the reasons given above, Appellants respectfully submit that one of ordinary skill in the art of ink jet ink technology would not have combined the teaching of Held, Pearlstine, Caiger, Breton or Smith with the teaching of Savu absent impermissible hindsight reasoning. Further, for at least the reasons given above, Appellants respectfully submit that one of ordinary skill in the art of ink jet ink technology would not have substituted the surfactant system disclosed in the teaching of Savu for any of the surfactant systems in the teachings of Held, Pearlstine, Caiger, Breton and Smith given the foam-generating property of the surfactants disclosed in the teaching of Savu.

CONCLUSION

For at least the reasons given above, Appellants respectfully submit that none of the references relied upon by Examiner Berman make obvious the claimed invention embodied in Appellant's claims 1-33. Accordingly, all of the above rejections should be reversed.

Please charge any additional fees or credit any overpayment to Merchant & Gould P.C., Deposit Account No. 13-2725.

Respectfully submitted,



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Atty. Docket No. 60103.0008US01

APPENDIX

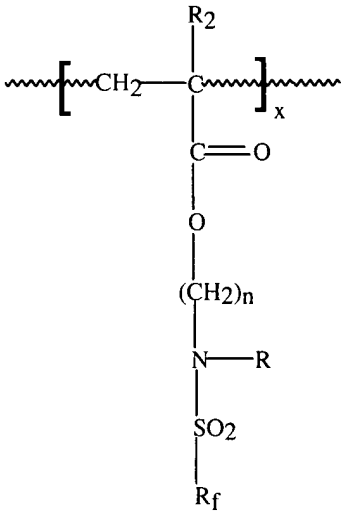
1. An inkjet ink composition comprising:

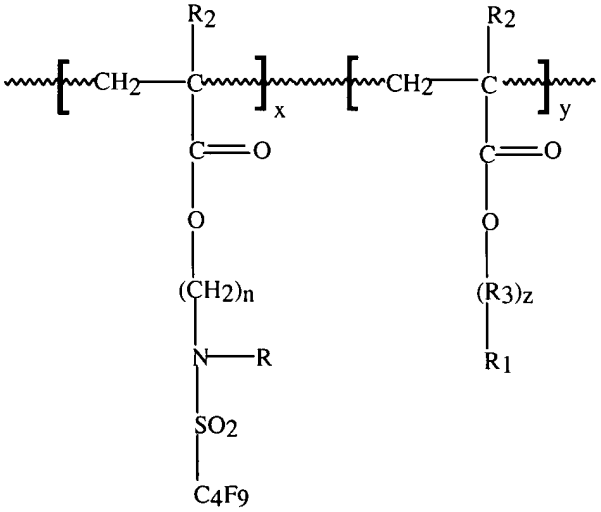
a colorant;

a vehicle; and

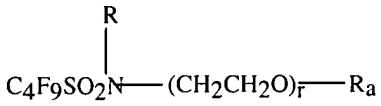
a fluorochemical surfactant;

wherein the fluorochemical surfactant comprises one or more surfactants having one or more chemical structures selected from:





and



wherein

~~~~ represents a bond in a polymer chain;

R_f is $-C_4F_9$ or $-C_3F_7$;

R, R_1, R_2 and R_a are each independently hydrogen or alkyl groups having 1 to 4 carbon atoms;

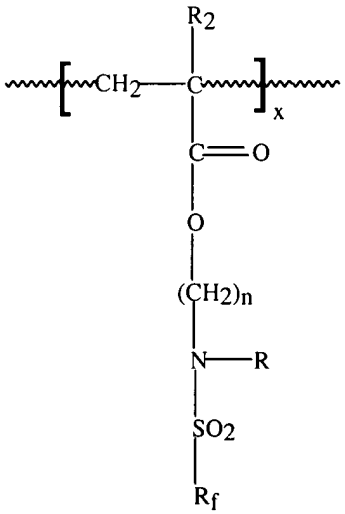
R_3 comprises one or more straight or branched polyalkylene-oxy groups having 2 to 6 carbon atoms in each group;

n is an integer from 2 to 10;

x, y and z are integers of at least 1; and

r is an integer of 2 to 20.

2. The ink composition of Claim 1, wherein the fluorochemical surfactant comprises one or more polymeric surfactants having a polymer chain comprising one or more units:



wherein
~~~~

R_f is $-C_4F_9$ or $-C_3F_7$;

R and R_2 are each independently hydrogen or alkyl groups having 1 to 4 carbon atoms;

n is an integer from 2 to 10; and

x is an integer of at least 1.

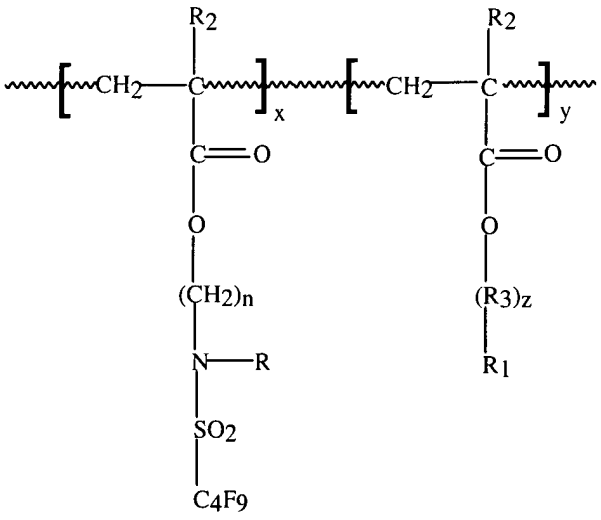
3. The ink composition of Claim 2, wherein

R_f is $-C_4F_9$;

R and R_2 are each independently hydrogen or methyl groups; and

n is 2.

4. The ink composition of Claim 1, wherein the fluorochemical surfactant comprises one or more polymeric surfactants having a polymer chain comprising one or more units:



wherein

R, R_1 and R_2 are each independently hydrogen or alkyl groups having 1 to 4 carbon atoms;

R_3 comprises one or more straight or branched polyalkylene-oxy groups having 2 to 6 carbon atoms in each group;

n is an integer from 2 to 10; and

x, y and z are integers of at least 1.

5. The ink composition of Claim 4, wherein R_3 comprises

$$(EO)_p\text{-}(PO)_q\text{-}(EO)_p$$

or

$$(PO)_q\text{-}(EO)_p\text{-}(PO)_q$$

wherein p is an integer of 1 to about 128 and q is an integer of 0 to about 54.

6. The ink composition of Claim 5, wherein R_3 comprises

$$(PO)_q\text{-}(EO)_p\text{-}(PO)_q$$

wherein p is about 17 and q is 0.

7. The ink composition of Claim 5, wherein R_3 comprises

$$(EO)_p\text{-}(PO)_q\text{-}(EO)_p$$

wherein p is an integer of about 14 to about 128 and q is an integer of about 9 to about 54.

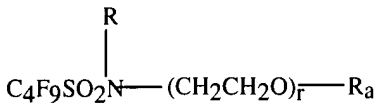
8. The ink composition of Claim 5, wherein p is an integer of about 7 to about 128 and q is an integer of about 21 to about 54.

9. The ink composition of Claim 8, wherein p is about 11 and q is about 21.

10. The ink composition of Claim 9, wherein the polymer chain does not comprise any other monomeric units.

11. The ink composition of Claim 5, wherein the polymer chain further comprises units derived from maleic anhydride, acrylonitrile, vinyl acetate, vinyl chloride, styrene, methyl acrylate, methyl methacrylate, ethylene, isoprene, butadiene, or combinations thereof.

12. The ink composition of Claim 1, wherein the fluorochemical surfactant comprises one or more surfactants having a chemical structure



wherein

R and R_a are each independently hydrogen or alkyl groups having 1 to 4 carbon atoms; and

r is an integer of 2 to 20.

13. The ink composition of Claim 12, wherein R and R_a are each independently methyl and r is an integer from 4 to 10.

14. The ink composition of Claim 1, wherein the vehicle is nonaqueous.

15. The ink composition of Claim 1, wherein the vehicle comprises a polymerizable material.

16. The ink composition of Claim 15, wherein the polymerizable material is free-radically polymerizable.

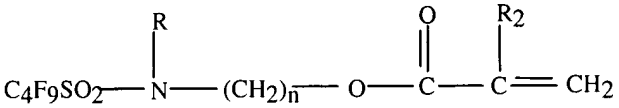
17. The ink composition of Claim 16, wherein the free-radically polymerizable material comprises at least one of an acrylate monomer and an acrylate oligomer.

18. The ink composition of Claim 1, wherein the vehicle is aqueous.

19. The ink composition of Claim 18, further comprising at least one of a humectant, and a colorant stabilizer.

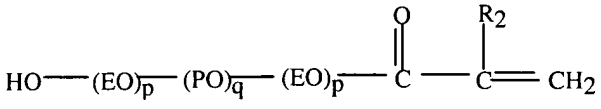
20. The ink composition of Claim 1, wherein the fluorochemical surfactant comprises a reaction product of:

(a) at least one compound having a formula

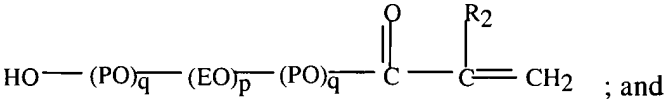


;

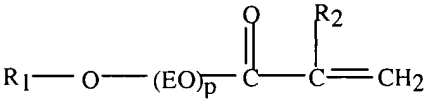
(b) at least one compound selected from the group consisting of



;

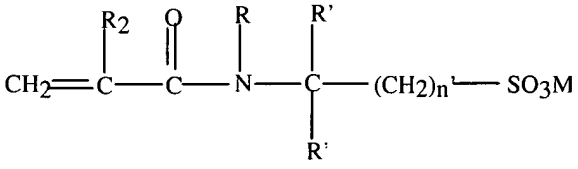


; and



; and optionally

(c) at least one compound having a formula



wherein

R, R_1, R' and R_2 are each independently hydrogen or an alkyl group having from 1 to 4 carbon atoms;

n is an integer from 2 to 10;

n' is an integer of 1 to 10;

p is an integer of 1 to about 128;

q is an integer of 0 to about 54; and

M is hydrogen, a metal cation, or a protonated tertiary amine.

21. The inkjet ink composition of Claim 1, wherein the ink composition has a Foam Stability Test value of less than about 30%.

22. The inkjet ink composition of Claim 21, wherein the ink composition is free of silicone-containing surfactants and defoamers.

23. A method of ink jet printing comprising ejecting the ink composition of Claim 1 from an ink jet printer head onto a substrate.

24. The method of Claim 23 further comprising the step of exposing the printed ink to actinic radiation.

25. The method of Claim 24, wherein the actinic radiation comprises ultraviolet radiation.

26. An article of manufacture comprising a substrate printed according to the method of Claim 23.

27. The article of Claim 26, wherein the substrate comprises wood, metal, paper, woven fabric, nonwoven fabric, leather, resin-coated paper, foil, a foam, a polymer film, or a combination thereof.

28. The article of Claim 27, wherein the substrate comprises single and multilayer nonporous polymer films of poly(vinyl chloride), polybutylene terephthalate, polyethylene terephthalate, acrylonitrile-butadiene-styrene copolymer, polystyrene, polycarbonate, polyurethane, epoxy, polyimide, polyamide, polymethyl (meth)acrylate, polyolefin,

polyamideimide, polyacrylate, polyacrylamide, melamine resins, polyvinyl butyral and copolymers thereof, and combinations thereof.

29. The article of Claim 27, wherein the substrate comprises single and multilayer constructions of paper, cardboard, non-woven fabric, woven fabric, leather, microporous film, and combinations thereof.

30. The article of Claim 26, wherein the article comprises a component for an outdoor sign, a roadway, a motor vehicle, a boat, an aircraft, or furniture.

31. The article of Claim 30, wherein the article comprises a retroreflective article.

32. The article of Claim 31, wherein the substrate comprises polymethyl methacrylate.

33. An ink jet printable radiation curable composition comprising:

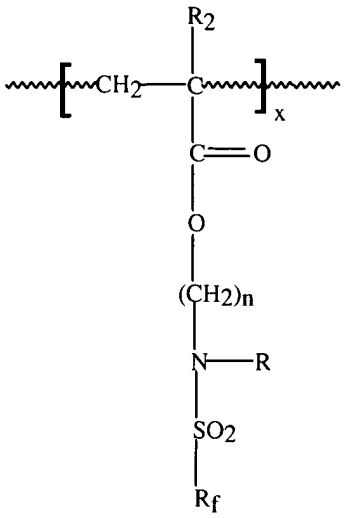
a vehicle comprising a polymerizable material;

a photoinitiator; and

a fluorochemical surfactant;

wherein no colorant is present; and

further wherein the fluorochemical surfactant comprises one or more surfactants having one or more chemical structures selected from:



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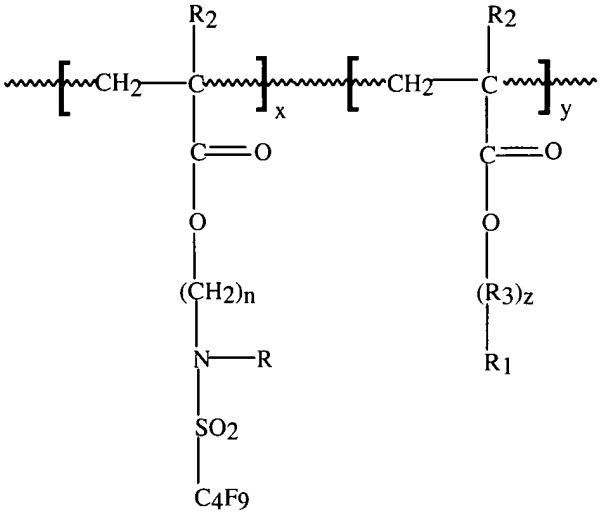

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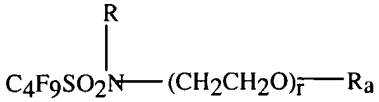


wherein

~~~~ represents a bond in a polymer chain;

R_f is $-C_4F_9$ or $-C_3F_7$;
~~~~

R, R_1, R_2 and R_a are each independently hydrogen or alkyl groups having 1 to 4 carbon atoms;

R_3 comprises one or more straight or branched polyalkylene-oxy groups having 2 to 6 carbon atoms in each group;

n is an integer from 2 to 10;

x, y and z are integers of at least 1; and

r is an integer of 2 to 20.

Patent
Docket No: 56473US002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Ylitalo et al.
Serial No.: 09/911,279
Filed: July 23, 2001

Group Art Unit: 1711

Examiner: S. Berman

For: INK JET INK COMPOSITIONS CONTAINING A FLUORINATED SURFACTANT

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on **January 09, 2004**.

January 09, 2004 — Date

James D. Withers — James D. Withers

BRIEF ON APPEAL

Board of Patent Appeals and Interferences
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

This is an appeal from the Office Action mailed on July 22, 2003 finally rejecting claims 1-33.

This Brief is being filed in triplicate. The fee required under 37 CFR §1.17(c) for the appeal should be charged to Deposit Account No. 13-2725. Appellants request the opportunity for a personal appearance before the Board of Appeals to argue the issues of this appeal. The fee for the personal appearance will be timely paid upon receipt of the Examiner's Answer.

TABLE OF CONTENTS

REAL PARTY IN INTEREST

The real party in interest is Minnesota Mining and Manufacturing of St. Paul, Minnesota and its affiliate 3M Innovative Properties Company of St. Paul, Minnesota.

RELATED APPEALS AND INTERFERENCES

The assignee, the assignee's legal representatives, and the patent applicant submit that there are no related appeals or interferences that are directly affected by or have a bearing on the Board's decision in this appeal.

STATUS OF CLAIMS

Claims 1-33 are pending in the present application. Claims 1-33 were rejected in a Final Office Action dated July 22, 2003. Each of the rejected claims, claims 1-33, has been appealed. A clean copy of the pending claims is attached as an Appendix.

STATUS OF AMENDMENTS

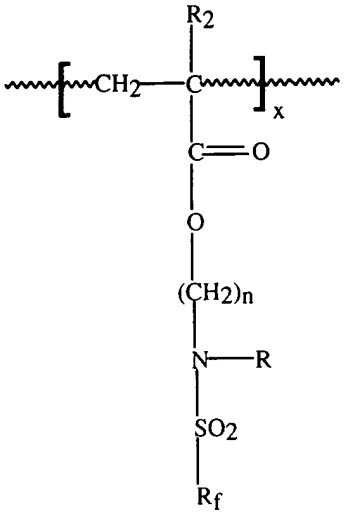
In response to a July 22, 2003 Final Office Action, an Amendment and Response was filed by Appellants on September 22, 2003. In an Advisory Action mailed on October 22, 2003, Examiner Berman entered the September 22, 2003 Amendment and Response for Appeal purposes.

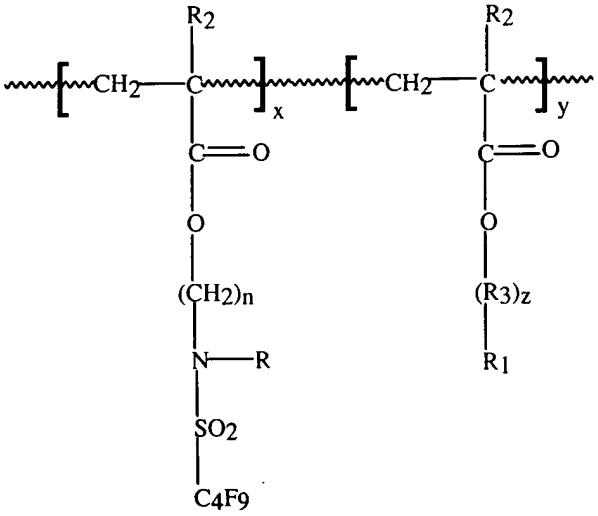
SUMMARY OF THE INVENTION

The present invention is directed to ink jet ink compositions containing one or more "C4" fluorochemical surfactants. As used herein, the term "C4 fluorinated surfactants" refers to fluorochemical surfactants having four carbon atoms in the fluorinated moiety of the surfactant. Appellants were the first to discover that "C4 fluorinated surfactants" could be used in ink jet ink compositions and provide desirable properties to the resulting ink jet ink compositions without generating undesirable levels of foam. Applicants of the present invention were the first to use the specific C4 fluorinated surfactants in ink jet ink compositions and ink jetting methods. Further, Applicants of the present invention were the first to discover that specific C4 fluorinated surfactants were superior to known fluorinated surfactants because the specific C4 fluorinated surfactants did not generate foam as did the previously used and known fluorinated surfactants.

As discussed in the "Background of the Invention" section of Appellants' specification, fluorinated surfactants have been known as effective materials for providing desirable performance requirements and surface wetting characteristics. However, the problem of foaming in ink jet ink applications is still a problem when using known fluorinated surfactants. See Appellants' specification, from page 1, line 23 to page 2, line 12. Appellants' present invention addresses the problem of foam associated with known fluorinated surfactants in ink jet ink applications by the discovery that C4 fluorochemical sulfonamide surfactants may be used in ink jet ink applications to provide desirable performance requirements and surface wetting characteristics, such as known fluorinated surfactants, but without generating undesirable levels of foam as is common with known fluorinated surfactants.

In one embodiment of the present invention, the ink jet ink compositions comprise, *inter alia*, a colorant, a vehicle, and a fluorochemical surfactant, wherein the fluorochemical surfactant comprises one or more surfactants having one or more chemical structures selected from:





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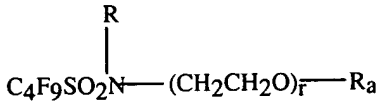
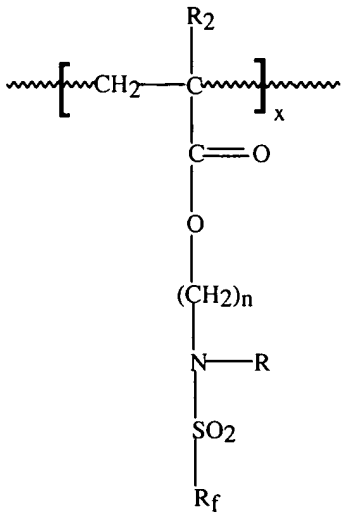
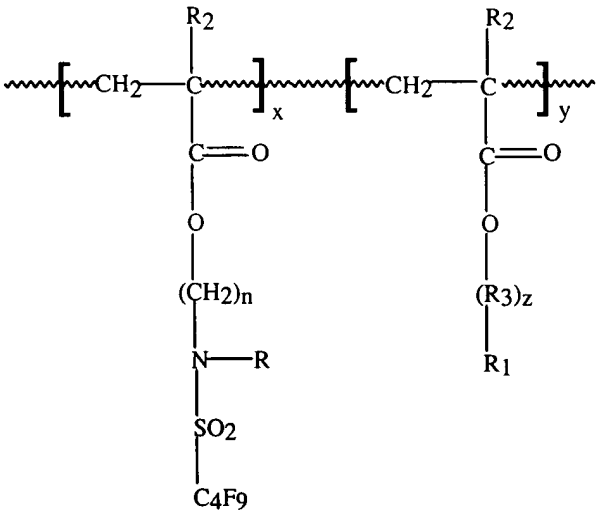


wherein ~~~~ represents a bond in a polymer chain; R_f is $-C_4F_9$ or $-C_3F_7$; R, R_1, R_2 and R_a are each independently hydrogen or alkyl groups having 1 to 4 carbon atoms; R_3 comprises one or more straight or branched polyalkylene-oxy groups having 2 to 6 carbon atoms in each group; n is an integer from 2 to 10; x, y and z are integers of at least 1; and r is an integer of 2 to 20.

In a further embodiment of the present invention, the ink jet ink composition comprises an ink jet printable, radiation curable composition. The radiation curable composition comprises, *inter alia*, a vehicle comprising a polymerizable material, a photoinitiator, and a

fluorochemical surfactant, wherein the fluorochemical surfactant comprises one or more surfactants having one or more chemical structures selected from:





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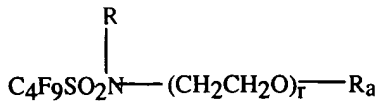


wherein ~~~~ represents a bond in a polymer chain; R_f is $-C_4F_9$ or $-C_3F_7$; R, R_1, R_2 and R_a are each independently hydrogen or alkyl groups having 1 to 4 carbon atoms; R_3 comprises one or more straight or branched polyalkylene-oxy groups having 2 to 6 carbon atoms in each group; n is an integer from 2 to 10; x, y and z are integers of at least 1; and r is an integer of 2 to 20. The radiation curable composition may or may not contain a colorant.

The present invention is even further directed to an article of manufacture comprising a substrate having one of the above-described ink jet ink compositions on a surface thereof. The substrate may comprise a variety of substrates including, but not limited to, wood, metal, paper, woven fabric, nonwoven fabric, leather, resin-coated paper, foil, a foam, a polymer film, single and multilayer nonporous polymer films, or a combination thereof. The substrate may further comprise a variety of materials including, but not limited to, the materials cited above, poly(vinyl chloride), polybutylene terephthalate, polyethylene terephthalate, acrylonitrile-butadiene-styrene copolymer, polystyrene, polycarbonate, polyurethane, epoxy, polyimide, polyamide, polymethyl (meth)acrylate, polyolefin, polyamideimide, polyacrylate, polyacrylamide, melamine resins, polyvinyl butyral and copolymers thereof, and combinations thereof. In one desired embodiment of the present invention, the substrate comprises a retroreflective article.

ISSUES ON APPEAL

The following issues are on appeal:

1) Whether claims 1-13, 18-21, 23 and 26-30 are unpatentable under 35 U.S.C. §103(a) in view of U.S. Patent No. 5,852,075 to Held (hereinafter, "Held") in combination with International Publication No. WO 01/30873 to Savu et al. (hereinafter, "Savu");

2) Whether claims 1-13, 18-23 and 26-30 are unpatentable under 35 U.S.C. §103(a) in view of European Patent Application No. 0974626 A1 to Pearlstine et al. (hereinafter, "Pearlstine") in combination with Savu;

3) Whether claims 1-17, 19-29 and 33 are unpatentable under 35 U.S.C. §103(a) in view of U.S. Patent No. 6,114,406 to Caiger et al. (hereinafter, "Caiger") in combination with Savu;

4) Whether claims 1-13, 15-23 and 26-30 are unpatentable under 35 U.S.C. §103(a) in view of U.S. Patent No. 5,863,320 to Breton et al. (hereinafter, "Breton") in combination with Savu;

5) Whether claims 1-13, 15-30 and 33 are unpatentable under 35 U.S.C. §103(a) in view of International Publication No. WO 99/07796 to Smith (hereinafter, "Smith") in combination with Savu; and

6) Whether claims 31-32 are unpatentable under 35 U.S.C. §103(a) in view of Smith, Held, Pearlstine, Caiger or Breton in combination with Savu, and further in view of U.S. Patent No. 6,113,679 to Adkins et al. (hereinafter, "Adkins").

GROUPING OF CLAIMS

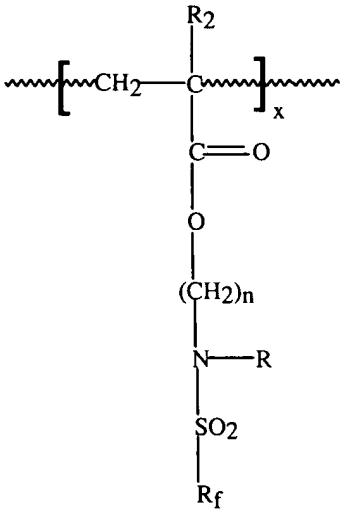
For the purpose of this Appeal, rejected claims 1-33 do not stand or fall together. Claim 1-33 are separately patentable for at least the reasons given below in the "Arguments" section.

ARGUMENTS OF APPELLANTS

Rejection of Claims 1-13, 18-21, 23 and 26-30 Under 35 U.S.C. §103(a) In View Of Held In Combination With Savu

Claims 1-13, 18-21, 23 and 26-30 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,852,075 to Held (hereinafter, "Held") in view of International Publication No. WO 01/30873 to Savu et al. (hereinafter, "Savu"). Reversal of this rejection is respectfully requested.

Appellants' claimed invention, as embodied in independent claim 1, is directed to an inkjet ink composition comprising, *inter alia*, a colorant; a vehicle; and a fluorochemical surfactant; wherein the fluorochemical surfactant comprises one or more surfactants having one or more chemical structures selected from:



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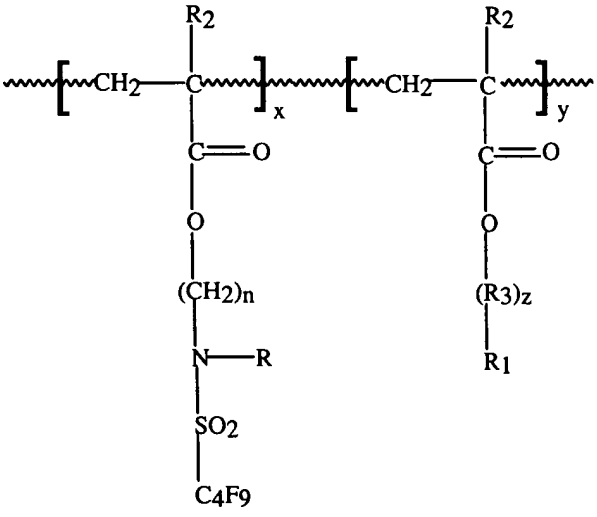

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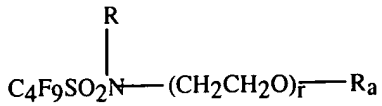


wherein ~~~~~ represents a bond in a polymer chain; R_f is $-C_4F_9$ or $-C_3F_7$; R, R_1, R_2 and R_a are each independently hydrogen or alkyl groups having 1 to 4 carbon atoms; R_3 comprises one or more straight or branched polyalkylene-oxy groups having 2 to 6 carbon atoms in each group; n is an integer from 2 to 10; x, y and z are integers of at least 1; and r is an integer of 2 to 20.

The teaching of Held relates to surfactant systems for ink jet ink compositions. Specifically, the teaching of Held relates to ink jet ink compositions containing a surfactant system, wherein the surfactant system *consists essentially of* (i) at least one siloxane surfactant, and (ii) at least one fluorinated surfactant of the formula $[R(f)Q]_nA$ wherein R(f) is a perfluoroalkyl group having 6 to 22 carbon atoms, Q is a divalent bridging group, A is a water soluble group, and n is 1 or 2. (Note that the disclosed fluorinated surfactants are from C6 to C22 fluorinated surfactants, not C4 fluorinated surfactants.)

The teaching of Held fails to teach or suggest an inkjet ink composition comprising one or more specific C4 fluorochemical surfactants as recited in Appellants' independent claim 1.

Examiner Berman relies on the teaching of Savu to allegedly cure the above-noted deficiencies in the disclosure of Held.

The teaching of Savu is directed to C4 fluorochemical sulfonamide surfactants. The disclosed fluorochemical sulfonamide surfactants are identical to those recited in Appellants' independent claim 1. In fact, the disclosure of Savu, which is assigned to The 3M Company, the assignee of the present application, is specifically incorporated by reference into the present application on page 13, lines 19-23 of Appellants' specification.

The teaching of Savu provides a variety of suitable applications for using the disclosed C4 fluorochemical sulfonamide surfactants; however, the teaching of Savu does not teach or suggest the use of the disclosed C4 fluorochemical sulfonamide surfactants in an ink jet ink composition. In fact, the teaching of Savu teaches away from the use of the disclosed C4 fluorochemical sulfonamide surfactants in ink jet applications due to their ability to form foam. As disclosed on page 22, lines 7-25, the teaching of Savu discloses the positive attributes of the disclosed C4 fluorochemical sulfonamide surfactants when used in the oil industry. Appellants respectfully submit that one of ordinary skill in the art given the teaching of Savu would not have expected the disclosed C4 fluorochemical sulfonamide surfactants to be suitable for use in

ink jet applications, and would not have been motivated to incorporate the disclosed C4 fluorochemical sulfonamide surfactants into an ink jet ink composition.

Examiner Berman suggests that one of ordinary skill in the art, given the teaching of Held, would have (1) realized that the teaching of Held had one or more shortcomings related to the disclosed surfactant system (i.e., C6 to C22 fluorinated surfactants), (2) sought out the teaching of Savu directed to foam-generating fluorinated surfactants, and (3) substituted one or more C4 fluorochemical sulfonamide surfactants from the teaching of Savu for the C6 to C22 fluorinated surfactant in the ink jet ink compositions of Held. Examiner Berman specifically states on page 3, lines 8-14 of the February 27, 2003 Office Action (paper no. 8):

> It would have been obvious to one skilled in the art to select a fluoroalcohol substituted monoether with polyethylene glycol as the fluorinated surfactant in the compositions disclosed by Held because Held uses a fluoroalcohol substituted monoether with polyethylene glycol in the examples (see Ink preparations 2, 3 and 4). It would further have been obvious to one skilled in the art to substitute a fluorochemical surfactant taught by WO'873 for the fluorinated surfactants containing a perfluoralkyl group and polyether groups taught by Held in the compositions disclosed by Held, with the expectation of providing similar or improved surfactant properties.

Appellants disagree.

Appellants respectfully submit that the teaching of Held fails to suggest to one of ordinary skill in the art the need to seek out the teaching of Savu, which is directed to applications other than ink jet ink technology. There is nothing in the teaching of Held to suggest to one of ordinary skill in the art the need to use a surfactant system other than the specific surfactant system disclosed in the teaching of Held. The teaching of Held is directed to a specific surfactant system *consisting essentially of* (i) a siloxane surfactant in combination with (ii) a C6 to C22 fluorinated surfactant. See, Held, column 4, lines 39-45, and from column 6, line 42 to column 7, line 47. Why would one of ordinary skill in the art want to modify the surfactant system of Held given the positive attributes of the disclosed surfactant system recited throughout the teaching of Held? (See, Held, column 1, line 66 to column 2, line 8).

Appellants further respectfully submit that the disclosure of Held fails to provide motivation to one skilled in the art to seek out fluorinated surfactants other than those specifically disclosed in the teaching of Held, namely, fluorinated surfactants having a formula $[R(f)Q]_nA$ wherein R(f) is a perfluoroalkyl group having 6 to 22 carbon atoms, Q is a divalent bridging group, A is a water soluble group, and n is 1 or 2. Certainly, the disclosure of Held does not provide motivation to one skilled in the art to substitute a C4 fluorochemical

sulfonamide surfactant as disclosed in Savu for the C6 to C22 fluorinated surfactants in the surfactant system disclosed in Held. In fact, the teaching of Held teaches away from such a substitution given that the teaching of Held specifically requires C6 to C22 fluorinated surfactants to be used in combination with the disclosed siloxane surfactant in order to produce the disclosed surfactant system.

It is not clear to Appellants why one of ordinary skill in the art would have modified the teaching of Held as proposed by Examiner Berman, namely, to substitute a C4 fluorochemical sulfonamide surfactant as disclosed in the teaching of Savu for a C6 to C22 fluorinated surfactant in the surfactant system disclosed in the teaching of Held. Appellants respectfully submit that the only motivation for such a modification of the teaching of Held has been gleaned from a review of Appellants' invention, not from what is being taught or suggested in the art.

For at least the reasons given above, Appellants respectfully submit that a *prima facie* case of obviousness has not been made, and that the combination of the teaching of Held with the teaching of Savu fails to make obvious Appellants' claimed invention as embodied in independent claim 1. Since claims 2-13, 18-21, 23 and 26-30 depend from independent claim 1, and recite additional claim features, Appellants respectfully submit that the combination of the teaching of Held with the teaching of Savu fails to make obvious claims 2-13, 18-21, 23 and 26-30.

It should be noted that the proposed combination of the teachings of Held and Savu, even if proper (and Appellants submit that the proposed combination is not proper), fails to teach or suggest the following claim features of dependent claims 21, 23 and 30:

(1) an ink jet ink composition as recited in independent claim 1, wherein the ink composition has a Foam Stability Test value of less than about 30% (claim 21); and

(2) an article of manufacture having the ink jet ink composition of independent claim 1 printed thereon, wherein the article comprises a component for an outdoor sign, a roadway, a motor vehicle, a boat, an aircraft, or furniture (claim 30).

For at least the reasons given above, it is respectfully submitted that the rejection of claims 1-13, 18-21, 23 and 26-30 under 35 U.S.C. §103(a) as being unpatentable over Held in view of Savu should be reversed.

Rejection of Claims 1-13, 18-23 and 26-30 Under 35 U.S.C. §103(a) In View Of Pearlstine In Combination With Savu

Claims 1-13, 18-23 and 26-30 stand rejected under 35 U.S.C. §103(a) as being unpatentable over European Patent Application No. 0974626 A1 to Pearlstine et al. (hereinafter, "Pearlstine") in view of Savu. Reversal of this rejection is respectfully requested.

A description of Appellants' claimed invention embodied in independent claim 1 and the teaching of Savu may be relied upon above.

The teaching of Pearlstine relates to ink jet ink compositions containing a siloxane surfactant or a fluorinated surfactant of the formula $[R(f)Q]_nA$ wherein R(f) is a perfluoroalkyl group having 6 to 22 carbon atoms, Q is a divalent bridging group, A is a water soluble group, and n is 1 or 2. It should be noted that the teaching of Pearlstine and the teaching of Held are both assigned to E.I. DuPont de Nemours and Company, and both disclose identical C6 to C22 fluorinated surfactants, which differ in structure from the C4 fluorochemical surfactants recited in Appellants' independent claim 1

Examiner Berman uses the same reasoning to combine the teaching of Pearlstine with the teaching of Savu and reject Appellants' claimed invention as embodied in independent claim 1. In particular, Examiner Berman suggests that one of ordinary skill in the art, given the teaching of Pearlstine, would have (1) realized that the teaching of Pearlstine had one or more shortcomings related to the disclosed surfactants (i.e., the C6 to C22 fluorinated surfactant), (2) sought out the teaching of Savu, and (3) substituted one or more C4 fluorochemical sulfonamide surfactants from the teaching of Savu for the C6 to C22 fluorinated surfactant within the disclosure of Pearlstine.

Appellants respectfully submit that the teaching of Pearlstine fails to teach or suggest to one of ordinary skill in the art the need to seek out fluorochemical surfactants other than those disclosed in the teaching of Pearlstine. The teaching of Pearlstine is directed to specific C6 to C22 fluorinated surfactants. Further, the teaching of Pearlstine specifically discloses preferred fluorochemical surfactants having from 6 to 16 carbon atoms in the fluorinated moiety. See, Pearlstine, page 6, Table 1. There simply is no suggestion in the teaching of Pearlstine that would have led one skilled in the art to the teaching of Savu and the specific C4 fluorochemical surfactants disclosed therein. Even if one of ordinary skill in the art would have been led to the teaching of Savu (which Appellants submits is not the case), one of ordinary skill in the art, given the teaching of Savu directed to foam-generating fluorinated surfactants, would not have incorporated such foam-generating fluorinated surfactants into an ink jet ink composition

Appellants further respectfully submit that the teaching of Pearlstine fails to provide motivation to one skilled in the art to seek out fluorinated surfactants other than those specifically disclosed in the teaching of Pearlstine, namely, fluorinated surfactants having a formula $[R(f)Q]_nA$ wherein R(f) is a perfluoroalkyl group having 6 to 22 carbon atoms, Q is a divalent bridging group, A is a water soluble group, and n is 1 or 2. Certainly, the teaching of Pearlstine does not provide motivation to one skilled in the art to substitute a foam-generating C4 fluorochemical sulfonamide surfactant as disclosed in the teaching of Savu for a C6 to C22 fluorinated surfactant disclosed in the teaching of Pearlstine.

It is not clear to Appellants why one of ordinary skill in the art would have modified the teaching of Pearlstine as proposed by Examiner Berman, namely, to substitute a C4 fluorochemical sulfonamide surfactant as disclosed in the teaching of Savu for a C6 to C22 fluorinated surfactant disclosed in the teaching of Pearlstine. Appellants respectfully submit that the only motivation for such a modification of the teaching of Pearlstine has been gleaned from a review of Appellants' invention, not from what is being taught or suggested in the art.

For at least the reasons given above, Appellants respectfully submit that a *prima facie* case of obviousness has not been made, and that the combination of the teaching of Pearlstine with the teaching of Savu fails to make obvious Appellants' claimed invention as embodied in independent claim 1. Since claims 2-13, 18-23 and 26-30 depend from independent claim 1, and recite additional claim features, Appellants respectfully submit that the combination of the teaching of Pearlstine with the teaching of Savu fails to make obvious claims 2-13, 18-23 and 26-30.

It should be noted that the proposed combination of the teachings of Pearlstine and Savu, even if proper (and Appellants submit that the proposed combination is not proper), fails to teach or suggest the following claim features of dependent claims 21 and 30:

(1) an ink jet ink composition as recited in independent claim 1, wherein the ink composition has a Foam Stability Test value of less than about 30% (claim 21); and

(2) an article of manufacture having the ink jet ink composition of independent claim 1 printed thereon, wherein the article comprises a component for an outdoor sign, a roadway, a motor vehicle, a boat, an aircraft, or furniture (claim 30).

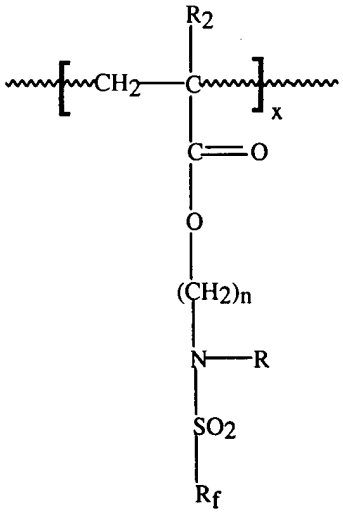
For at least the reasons given above, it is respectfully submitted that the rejection of claims 1-13, 18-23 and 26-30 under 35 U.S.C. §103(a) as being unpatentable over Pearlstine in view of Savu should be reversed.

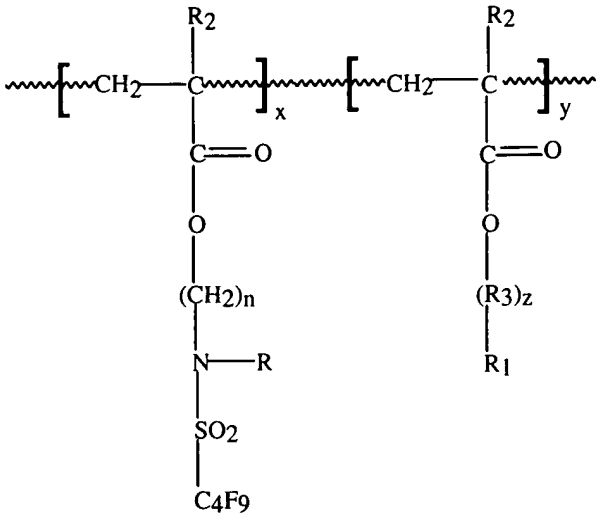
Rejection of Claims 1-17, 19-29 and 33 Under 35 U.S.C. §103(a) In View Of Caiger In Combination With Savu

Claims 1-17, 19-29 and 33 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,114,406 to Caiger et al. (hereinafter, "Caiger") in view of Savu. Reversal of this rejection is respectfully requested.

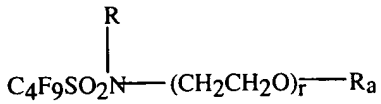
A description of Appellants' claimed invention embodied in independent claim 1 and the teaching of Savu may be relied upon above.

Appellants' claimed invention, as embodied in independent claim 33, is directed to an ink jet printable radiation curable composition comprising, *inter alia*, a vehicle comprising a polymerizable material; a photoinitiator; and a fluorochemical surfactant; wherein no colorant is present; and further wherein the fluorochemical surfactant comprises one or more surfactants having one or more chemical structures selected from:





and



wherein ~~~~ represents a bond in a polymer chain; R_f is $-C_4F_9$ or $-C_3F_7$; R, R_1, R_2 and R_a are each independently hydrogen or alkyl groups having 1 to 4 carbon atoms; R_3 comprises one or more straight or branched polyalkylene-oxy groups having 2 to 6 carbon atoms in each group; n is an integer from 2 to 10; x, y and z are integers of at least 1; and r is an integer of 2 to 20.

The teaching of Caiger relates to radiation curable ink compositions containing a polyfunctional alkoxylated and/or polyfunctional polyalkoxylated acrylate monomer material, and a photoinitiator. The disclosed compositions may also include non-alkoxylated radiation curable monomers, surfactants, photoinitiator stabilizers, etc. The teaching of Caiger discloses the use of a C8 fluorinated surfactant, FLUORAD 430, in column 3, lines 52-55.

The teaching of Caiger fails to teach or suggest an inkjet ink composition comprising one or more specific C4 fluorochemical surfactants as recited in Appellants' independent claim 1.

Examiner Berman relies on the teaching of Savu to allegedly cure the above-noted deficiencies in the teaching of Caiger.

Examiner Berman suggests that one of ordinary skill in the art, given the teaching of Caiger, would have (1) realized that the teaching of Caiger had one or more shortcomings related to surfactants (i.e., C8 fluorinated surfactants), (2) sought out the teaching of Savu, and (3) substituted one or more C4 fluorochemical sulfonamide surfactants from the teaching of

Savu for the C8 fluorinated surfactant disclosed in the teaching of Caiger. Examiner Berman specifically states on page 3, lines 8-14 of the February 27, 2003 Office Action (paper no. 8):

> It would have been obvious to one skilled in the art to employ the fluorochemical surfactants taught by WO'873 as the fluoro surfactant in the ink compositions disclosed in Caiger et al. Caiger et al. teach that the surfactant is preferably a nonionic surfactant and a fluoro surfactant, thus providing motivation to employ nonionic fluorosurfactants in the disclosed ink compositions.

Appellants disagree.

Appellants respectfully submit that the teaching of Caiger fails to provide motivation to one skilled in the art to seek out the teaching of Savu, and especially, the specific C4 fluorochemical sulfonamide surfactants disclosed in the teaching of Savu. The disclosure of Caiger already discloses suitable fluoro surfactants, such as the C8 surfactant FLUORAD FC430, for use in the ink compositions disclosed in Caiger. See, Caiger, column 3, lines 52-55. It is not clear to Appellants why one of ordinary skill in the art would have (i) sought out the teaching of Savu and (ii) replaced an acceptable C8 fluoro surfactant as disclosed in the teaching of Caiger with a specific C4 fluorochemical sulfonamide surfactant disclosed in the teaching of Savu. Appellants respectfully submit that the only motivation for such an alteration of the teaching of Caiger has been gleaned from a review of Appellants' invention, not from what is being taught or suggested in the art.

For at least the reasons given above, Appellants respectfully submit that a *prima facie* case of obviousness has not been made, and that the combination of the teaching of Caiger with the teaching of Savu fails to make obvious Appellants' claimed invention as embodied in independent claims 1 and 33. Since claims 2-17 and 19-29 depend from independent claim 1, and recite additional claim features, Appellants respectfully submit that the combination of the teaching of Caiger with the teaching of Savu fails to make obvious claims 2-17 and 19-29.

It should be noted that the proposed combination of the teachings of Caiger and Savu, even if proper (and Appellants submit that the proposed combination is not proper), fails to teach or suggest the following claim features of dependent claims 21 and 29:

(1) an ink jet ink composition as recited in independent claim 1, wherein the ink composition has a Foam Stability Test value of less than about 30% (claim 21); and

(2) an article of manufacture having the ink jet ink composition of independent claim 1 printed thereon, wherein the article comprises single and multilayer constructions of paper,

cardboard, non-woven fabric, woven fabric, leather, microporous film, and combinations thereof (claim 29).

For at least the reasons given above, it is respectfully submitted that the rejection of claims 1-17, 19-29 and 33 under 35 U.S.C. §103(a) as being unpatentable over Caiger in view of Savu should be reversed.

Rejection of Claims 1-13, 15-23 and 26-30 Under 35 U.S.C. §103(a) In View Of Breton In Combination With Savu

Claims 1-13, 15-23 and 26-30 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,863,320 to Breton et al. (hereinafter, "Breton") in view of Savu. Reversal of this rejection is respectfully requested.

A description of Appellants' claimed invention embodied in independent claim 1 and the disclosure of Savu may be relied upon above.

The teaching of Breton relates to ink compositions containing a perfluorosurfactant.

The teaching of Breton fails to teach or suggest an inkjet ink composition comprising one or more specific C4 fluorochemical surfactants as recited in Appellants' independent claim 1.

Examiner Berman relies on the teaching of Savu to allegedly cure the above-noted deficiencies in the teaching of Breton.

Examiner Berman suggests that one of ordinary skill in the art, given the teaching of Breton, would have (1) realized that the teaching of Breton had one or more shortcomings related to the disclosed perfluorosurfactants, (2) sought out the teaching of Savu, and (3) substituted one or more fluorochemical sulfonamide surfactants from the teaching of Savu for the perfluorosurfactant in the ink compositions of Breton. Examiner Berman specifically states on page 6, lines 1-5 of the February 27, 2003 Office Action (paper no. 8):

> It would have been obvious to one skilled in the art to employ the fluorochemical surfactants taught by WO'873 as the perfluorosurfactant in the ink compositions disclosed by Breton et al. Breton et al. teach that the surfactant is preferably a perfluorooctanesulfonamide ethylacrylate, thus providing motivation to employ perfluoro- sulfonamide ethylacrylate fluorosurfactants in the disclosed ink compositions.

Appellants disagree.

Appellants respectfully submit that the disclosure of Breton fails to provide motivation to one skilled in the art to seek out the teaching of Savu, and especially, the specific fluorochemical sulfonamide surfactants disclosed in the teaching of Savu. The disclosure of

Breton discloses suitable perfluorosurfactants, such as perfluorooctanesulfonamide ethylacrylate, for use in the disclosed ink compositions. It is not clear to Appellants why one of ordinary skill in the art, given the teaching of Breton, would have (i) sought out the teaching of Savu and (ii) replaced one of the acceptable perfluorosurfactant as disclosed in the teaching of Breton with a specific C4 fluorochemical sulfonamide surfactant disclosed in the teaching of Savu. Appellants respectfully submit that the only motivation for such an alteration of the teaching of Breton has been gleaned from a review of Appellants' invention, not from what is being taught or suggested in the art.

For at least the reasons given above, Appellants respectfully submit that a *prima facie* case of obviousness has not been made, and that the combination of the teaching of Breton with the teaching of Savu fails to make obvious Applicants' claimed invention as embodied in independent claim 1. Since claims 2-13, 15-23 and 26-30 depend from independent claim 1, and recite additional claim features, Appellants respectfully submit that the combination of the teaching of Breton with the teaching of Savu fails to make obvious claims 15-23 and 26-30.

It should be noted that the proposed combination of the teachings of Breton and Savu, even if proper (and Appellants submit that the proposed combination is not proper), fails to teach or suggest the following claim features of dependent claims 15-17, 21 and 30:

(1) an ink jet ink composition as recited in independent claim 1, wherein the vehicle of the ink composition comprises a polymerizable material (claim 15);

(2) an ink jet ink composition as recited in claim 15, wherein the polymerizable material is free-radically polymerizable (claim 16);

(3) an ink jet ink composition as recited in claim 16, wherein the free-radically polymerizable material comprises at least one of an acrylate monomer and an acrylate oligomer (claim 17);

(4) an ink jet ink composition as recited in independent claim 1, wherein the ink composition has a Foam Stability Test value of less than about 30% (claim 21); and

(5) an article of manufacture having the ink jet ink composition of independent claim 1 printed thereon, wherein the article comprises a component for an outdoor sign, a roadway, a motor vehicle, a boat, an aircraft, or furniture (claim 30).

For at least the reasons given above, it is respectfully submitted that the rejection of claims 1-13, 15-23 and 26-30 under 35 U.S.C. §103(a) as being unpatentable over Breton in view of Savu should be reversed.

Rejection of Claims 1-13, 15-30 and 33 Under 35 U.S.C. §103(a) In View Of Smith In Combination With Savu

Claims 1-13, 15-30 and 33 stand rejected under 35 U.S.C. §103(a) as being unpatentable over International Publication No. WO 99/07796 to Smith (hereinafter, "Smith") in view of Savu. Reversal of this rejection is respectfully requested.

A description of Appellants' claimed invention embodied in independent claims 1 and 33, and the teaching of Savu may be relied upon above.

The teaching of Smith relates to ink compositions containing a fluorinated surfactant. The teaching of Smith discloses the use of FLUORAD FC129 (a C8 fluorinated surfactant) throughout the examples.

The teaching of Smith fails to teach or suggest an inkjet ink composition comprising one or more specific C4 fluorochemical surfactants as recited in Appellants' independent claim 1.

Examiner Berman relies on the teaching of Savu to allegedly cure the above-noted deficiencies in the teaching of Smith.

Examiner Berman suggests that one of ordinary skill in the art, given the teaching of Smith, would have (1) realized that the teaching of Smith had one or more shortcomings related to the disclosed C8 fluorinated surfactants, (2) sought out the teaching of Savu, and (3) substituted one or more C4 fluorochemical sulfonamide surfactants from the teaching of Savu for the C8 fluorinated surfactant within the disclosure of Smith. Appellants disagree.

Appellants respectfully submit that the teaching of Smith fails to provide motivation to one skilled in the art to seek out the teaching of Savu, and especially, the specific C4 fluorochemical sulfonamide surfactants disclosed in the teaching of Savu. The disclosure of Smith discloses a suitable C8 fluorinated surfactant for use in the ink compositions of Smith. It is not clear to Appellants why one of ordinary skill in the art would have (i) sought out the teaching of Savu and (ii) replaced one of the acceptable fluorinated surfactants as disclosed in the teaching of Smith with a specific fluorochemical sulfonamide surfactant disclosed in the teaching of Savu. Appellants respectfully submit that the only motivation for such an alteration of the teaching of Smith has been gleaned from a review of Appellants' invention, not from what is being taught or suggested in the art.

Further, in regard to independent claim 33, it should be noted that the disclosure of Smith does not suggest to one of skill in the art to remove the colorant disclosed in each of the ink compositions of Smith.

For at least the reasons given above, Appellants respectfully submit that a *prima facie* case of obviousness has not been made, and that the combination of the teaching of Smith with the teaching of Savu fails to make obvious Appellants' claimed invention as embodied in independent claim 1. Since claims 2-13 and 15-30 depend from independent claim 1, and recite additional claim features, Appellants respectfully submit that the combination of the teaching of Smith with the teaching of Savu fails to make obvious claims 2-13 and 15-30.

It should be noted that the proposed combination of the teachings of Breton and Savu, even if proper (and Appellants submit that the proposed combination is not proper), fails to teach or suggest the following claim features of dependent claims 15-17, 21 and 30:

(1) an ink jet ink composition as recited in independent claim 1, wherein the ink composition has a Foam Stability Test value of less than about 30% (claim 21); and

(2) an article of manufacture having the ink jet ink composition of independent claim 1 printed thereon, wherein the article comprises a component for an outdoor sign, a roadway, a motor vehicle, a boat, an aircraft, or furniture (claim 30).

For at least the reasons given above, it is respectfully submitted that the rejection of claims 1-13, 15-30 and 33 under 35 U.S.C. §103(a) as being unpatentable over Smith in view of Savu should be reversed.

Rejection of Claims 31-32 Under 35 U.S.C. §103(a) In View Of Smith, Held, Pearlstine, Caiger or Breton In Combination With Savu and Further In View Of Adkins

Claims 31-32 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Smith, Held, Pearlstine, Caiger or Breton in view of Savu, and further in view of U.S. Patent No. 6,113,679 to Adkins et al. (hereinafter, "Adkins"). Reversal of this rejection is respectfully requested.

A description of Appellants' claimed invention embodied in independent claim 1, and the teachings of Smith, Held, Pearlstine, Caiger, Breton and Savu may be relied upon above.

Claims 31-32 are directed to a retroreflective article containing a substrate comprises polymethyl methacrylate having printed thereon the ink jet ink composition of independent claim 1. Appellants respectfully submit that claims 31-32 are patentable over the disclosures of Smith, Held, Pearlstine, Caiger, Breton and Savu for at least the reasons given above with regard to independent claim 1. Appellants further respectfully submit that claims 31-32 are patentable over any combination of the teachings of Smith, Held, Pearlstine, Caiger, and Breton with the teaching of Savu and further with the teaching of Adkins for at least the following reasons.

The teachings of Smith, Held, Pearlstine, Caiger, Breton and Savu fail to teach or suggest a retroreflective article having a substrate comprises polymethyl methacrylate and an inkjet ink composition thereon, wherein the inkjet ink composition comprises one or more specific C4 fluorochemical surfactants as recited in Appellants' independent claim 1. Examiner Berman relies on the teaching of Adkins to allegedly cure the above-noted deficiencies in the teachings of Smith, Held, Pearlstine, Caiger, Breton and Savu.

Examiner Berman suggests that one of ordinary skill in the art, given any one of the teachings of Smith, Held, Pearlstine, Caiger and Breton, would have (1) realized that the teaching of Smith, Held, Pearlstine, Caiger, or Breton had one or more shortcomings related to the disclosed C6 to C22 fluorinated surfactants, (2) sought out the teaching of Savu, (3) substituted one or more C4 fluorochemical sulfonamide surfactants from the teaching of Savu for the C6 to C22 fluorinated surfactants within the ink jet ink compositions disclosed in the teachings of Smith, Held, Pearlstine, Caiger and Breton to form a new C4 fluorochemical sulfonamide surfactant-containing ink jet ink composition, and then (4) sought out the teaching of Adkins for a retroreflective substrate on which to apply the new C4 fluorochemical sulfonamide surfactant-containing ink jet ink composition. Appellants disagree.

As discussed above, it is not clear to Appellants why one of ordinary skill in the art, given any one of the teachings of Smith, Held, Pearlstine, Caiger and Breton, would have modified the ink compositions disclosed in the teachings of Smith, Held, Pearlstine, Caiger and Breton as proposed by Examiner Berman (i.e., to substitute a C4 fluorochemical sulfonamide surfactant for a C6 to C22 fluorinated surfactant). Further, it is not clear to Appellants why one of ordinary skill in the art, given any one of the teachings of Smith, Held, Pearlstine, Caiger and Breton and the teaching of Savu (assuming that one of ordinary skill in the art would have been lead to the teaching of Savu), would have sought out a specific substrate, such as a retroreflective substrate, as disclosed in the teaching of Adkins. Appellants respectfully submit that the only motivation for such a modification of the teachings of Smith, Held, Pearlstine, Caiger, Breton, Savu and Adkins has been deemed from a review of Appellants' invention, not from what is being taught or suggested in the art.

For at least the reasons given above, Appellants respectfully submit that a *prima facie* case of obviousness has not been made, and that the combination of any of the teachings of Smith, Held, Pearlstine, Caiger and Breton with the teaching of Savu, and further with the teaching of Adkins, fails to make obvious Appellants' claimed invention as embodied in claims 31-32.

For at least the reasons given above, it is respectfully submitted that the rejection of claims 31-32 under 35 U.S.C. §103(a) as being unpatentable over Smith, Held, Pearlstine, Caiger and Breton with the teaching of Savu, and further with the teaching of Adkins should be reversed.

Response To Appellant's Arguments

In the final Office Action mailed on July 22, 2003 (paper no. 13), Examiner Berman maintains the position that one of ordinary skill in the art would have been motivated to (i) seek out the teaching of Savu, and (ii) modify the disclosed ink jet ink compositions in the teachings of Held, Pearlstine, Caiger, Breton and Smith by substituting a C4 fluorinated surfactants as disclosed in the teaching of Savu for a C6 to C22 fluorinated surfactants as disclosed in the teachings of Held, Pearlstine, Caiger, Breton and Smith. Examiner Berman specifically states on page 2, lines 4-7 of the July 22, 2003 Office Action (paper no. 13):

> Applicant argues that the primary references do not provide motivation to substitute other surfactants for those disclosed. This argument is not persuasive *because each of the primary references teaches using perfluorinated surfactants in ink jet ink compositions, thus providing motivation to employ perfluorinated surfactants in the disclosed ink compositions*. (Emphasis added.)

Appellants have argued, and continue to argue, that none of the teachings of Held, Pearlstine, Caiger, Breton and Smith suggest to one of ordinary skill in the art or provide motivation to one of ordinary skill in the art to substitute the specific C4 fluorinated surfactants disclosed in the teaching of Savu for the surfactant systems disclosed in the teachings of Held, Pearlstine, Caiger, Breton and Smith. Appellants have not argued, and do not presently argue, that the teachings of Held, Pearlstine, Caiger, Breton and Smith fail to suggest to one of ordinary skill in the art or provide motivation to one of ordinary skill in the art to use C6 to C22 fluorinated surfactants, only that the teachings of Held, Pearlstine, Caiger, Breton and Smith fail to suggest to one of ordinary skill in the art or provide motivation to one of ordinary skill in the art to use C4 fluorinated surfactants. Applicants have noted above that each of the teachings of Held, Pearlstine, Caiger, Breton and Smith disclose surfactant systems for ink jet ink compositions, wherein the disclosed surfactant systems comprise (i) fluorinated surfactants containing a fluorinated alkyl group having from 6 to 22 carbon atoms, (ii) siloxane surfactants, or (iii) a combination thereof. However, the teachings of Held, Pearlstine, Caiger, Breton and Smith do not teach or suggest the use of specific C4 fluorinated surfactants as featured in Appellants' claimed invention.

Examiner Berman further argues that one of ordinary skill in the art would have been motivated to seek out the teaching of Savu, and substitute the C4 surfactants of Savu into the ink jet ink compositions disclosed in the teachings of Held, Pearlstine, Caiger, Breton and Smith by stating on page 2, lines 7-15 of the July 22, 2003 Office Action (paper no. 13):

> Savu et al teach perfluorinated surfactants considered to be analogous in structure and having the same function as the surfactants disclosed by the primary references. Savu et al specifically teach that surfactants derived from perfluorobutanesulfonyl fluoride have surface activities that surprisingly rival the surface activities of homologs made from perfluorooctane segments such as perfluorooctanesulfonyl fluoride (page 2, lines 13-16). Thus, one of ordinary skill in the art at the time of the invention would have been motivated to substitute that surfactants containing perfluorobutanesulfonyl groups for surfactants containing perfluorooctanesulfonyl groups by a reasonable expectation of successfully providing an ink jet ink and also by an expectation of providing the advantageous surface activities taught by Savu et al.

Appellants disagree that the teaching of Savu discloses "perfluorinated surfactants considered to be analogous in structure and having the same function as the surfactants disclosed by the primary references" as stated by Examiner Berman. The teaching of Savu clearly distinguishes perfluorobutanesulfonyl surfactants from other fluorinated surfactants by (i) the chemical structure of the surfactants, and (ii) the chemical properties of the disclosed surfactants. More importantly, there is no suggestion in the teaching of Savu that the disclosed surfactants are "analogous in structure" or "have the same function" as surfactants disclosed in the primary references, namely, the teachings of Held, Pearlstine, Caiger, Breton and Smith. It is important to note that any comparison of one surfactant with another surfactant in the teaching of Savu is not comparing the use of one surfactant in an ink jet ink composition versus the use of another surfactant in an ink jet ink composition. As discussed above, and central to Appellants' arguments, is the fact that the teaching of Savu is not concerned with ink jet ink compositions, surfactants for use in ink jet ink compositions, or chemical properties of surfactants for use in ink jet ink compositions.

Appellants want to be clear about the arguments made with regard to the proposed combination of any one of the teachings of Held, Pearlstine, Caiger, Breton and Smith with the teaching of Savu. First, Appellants respectfully submit that one of ordinary skill in the art would not have sought out the teaching of Savu, which is not directed to the art of ink jet ink technology, given any one of the teachings of Held, Pearlstine, Caiger, Breton and Smith, which are directed to the art of ink jet ink technology. As stated in Appellants' May 27, 2003

Amendment and Response (paper no. 12), it is not clear to Appellants why one of ordinary skill in the art would have sought out the teaching of Savu when the teaching of Savu is outside the scope of the art of ink jet ink technology. That is the first question that must be asked when analyzing Examiner Berman's proposed combination of references. Second, what does the teaching of Savu suggest to one of ordinary skill in the art of ink jet ink technology?

Even if one of ordinary skill in the art of ink jet ink technology was directed to the teaching of Savu, why would one of ordinary skill in the art substitute a foam-generating surfactant as disclosed in the teaching of Savu into an ink jet ink composition of Held, Pearlstine, Caiger, Breton or Smith knowing that the generation of foam in ink jet ink compositions is a serious problem in the art of ink jet ink technology? Appellants respectfully submit that one of ordinary skill in the art, given the disclosure of Savu, would have been directed away from such a substitution given that the teaching of Savu highlights the generation of foam using the disclosed surfactants. Again, the only motivation for substituting a surfactant, such as those disclosed in the teaching of Savu, for the surfactants disclosed in the ink jet ink compositions of Held, Pearlstine, Caiger, Breton and Smith has been gleaned from a review of Applicants' invention, not from what is being taught or suggested in the art of record.

As discussed in Appellants' May 27, 2003 Amendment and Response (paper no. 12), the disclosure of Savu teaches away from the use of the disclosed fluorochemical sulfonamide surfactants in ink jet ink applications due to their ability to generate foam. It is well known in the art of ink jet ink technology that components are not added to ink jet ink compositions in order to produce foam. On the contrary, antifoam additives are a common additive to, and are usually a necessary additive to ink jet ink compositions so as to minimize the generation of foam during storage, handling and jetting of ink jet ink compositions. As disclosed on page 22, lines 7-25, the teaching of Savu discloses the positive attributes of the disclosed fluorochemical sulfonamide surfactants, namely, the ability to form a stable foam, when used in the oil industry. (Appellants further note independent claim 69 of Savu directed to a method of forming a stable foam.)

Examiner Berman maintains that the teaching of Savu does suggest the use of the disclosed surfactants in ink jet ink compositions. Addressing Appellants' argument that the teaching of Savu actually teaches away from the use of the disclosed surfactants in ink jet ink compositions, Examiner Berman states on page 2, lines 17-23 of the July 22, 2003 Office Action (paper no. 13):

> This argument is not persuasive because Savu et al teach that the disclosed surfactants are advantageous to use in place of homologs made from perfluorooctane segments such as perfluorooctanesulfonyl fluoride (POSF) (page 2, lines 13-25). Several methods of use are taught, including oil well stimulation additives and coating additives in coating applications, wetting agents or additives in photoresists, and leveling agents for resist inks and other inks (page 25, lines 17-27). Thus, although ink jet inks are not specifically mentioned, use in ink formulations is clearly suggested.

As stated above, the teaching of Savu compares the use of perfluorobutanesulfonyl-containing surfactants with perfluorooctanesulfonyl fluoride (POSF) surfactants in compositions **other than ink jet ink compositions**. Examiner Berman acknowledges that the teaching of Savu fails to teach or suggest ink jet ink compositions; however, Examiner Berman maintains that the disclosure of Savu suggests to one of ordinary skill in the art of ink jet ink technology that perfluorobutanesulfonyl-containing surfactants would provide desired properties in ink jet ink compositions such as those disclosed in the teachings of Held, Pearlstine, Caiger, Breton and Smith. Appellants disagree for at least the reasons given above.

It should be noted that the teaching Savu teaches the use of C4 fluorochemical sulfonamide surfactants in specific ink compositions, namely, "resist inks for electronics and semiconductors," "inks such as gravure coat, screen print and thermal print" inks, and "pen inks." See, Savu, page 25, lines 17-27. Clearly, the teaching of Savu does not teach or suggest ink jet inks, which differ substantially from the above-mentioned inks in both ink composition components and methods of applying the inks.

In Appellants' May 27, 2003 Amendment and Response (paper no. 12), Appellants respectfully submitted that one of ordinary skill in the art of ink jet ink technology would not have expected the foam-generating surfactants disclosed in the teaching of Savu to be suitable for use in ink jet ink compositions such as those disclosed in the teachings of Held, Pearlstine, Caiger, Breton and Smith. In response, Examiner Berman states on page 3, lines 1-8 of the July 22, 2003 Office Action (paper no. 13):

> Applicant argues that the surfactants taught by Savu et al would not have been expected to be suitable for use in ink jet applications due to their ability to form foam. This argument is not persuasive because the example given by Savu et al of foam stability involves adding heptane to an acrylate composition to obtain a stable sea water foam upon shaking. Savu et al do not teach or suggest that the disclosed surfactants will cause foaming of ink compositions. One of ordinary skill in the art at the time the invention would not have been motivated to obtain a foam in a ink jet ink composition in the absence of foaming agent. Savu et al do not teach

> or suggest foaming other kinds of compositions than those in Examples 52-56.

Examiner Berman seems to be suggesting that the teaching of Savu only discloses the foam-generating property of the disclosed surfactants in connection with a heptane-containing solution. Appellants disagree. Appellants note that independent claim 69 of Savu is directed to a method of generating a stable foam comprising, *inter alia*, adding one of the disclosed surfactants to a "water or an aqueous dispersion or solution," not a heptane-containing solution.

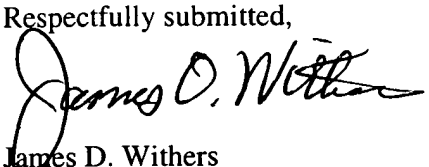
For at least the reasons given above, Appellants respectfully submit that one of ordinary skill in the art of ink jet ink technology would not have combined the teaching of Held, Pearlstine, Caiger, Breton or Smith with the teaching of Savu absent impermissible hindsight reasoning. Further, for at least the reasons given above, Appellants respectfully submit that one of ordinary skill in the art of ink jet ink technology would not have substituted the surfactant system disclosed in the teaching of Savu for any of the surfactant systems in the teachings of Held, Pearlstine, Caiger, Breton and Smith given the foam-generating property of the surfactants disclosed in the teaching of Savu.

CONCLUSION

For at least the reasons given above, Appellants respectfully submit that none of the references relied upon by Examiner Berman make obvious the claimed invention embodied in Appellant's claims 1-33. Accordingly, all of the above rejections should be reversed.

Please charge any additional fees or credit any overpayment to Merchant & Gould P.C., Deposit Account No. 13-2725.

Respectfully submitted,



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Atty. Docket No. 60103.0008US01

APPENDIX

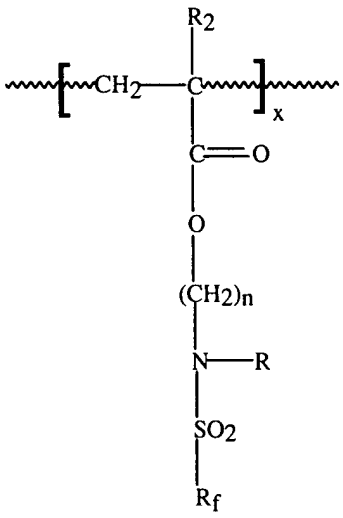
1. An inkjet ink composition comprising:

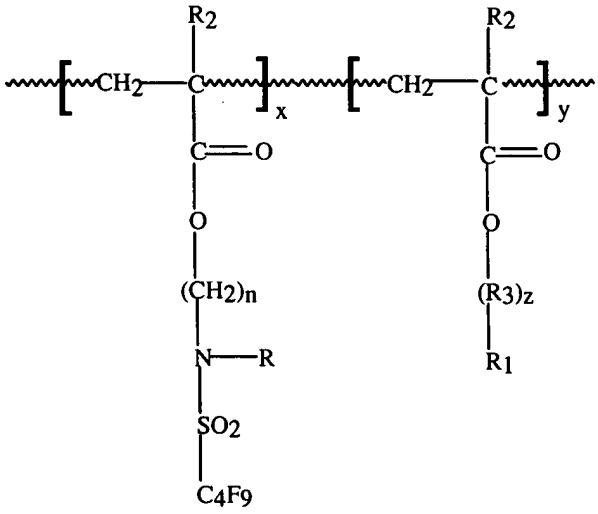
a colorant;

a vehicle; and

a fluorochemical surfactant;

wherein the fluorochemical surfactant comprises one or more surfactants having one or more chemical structures selected from:





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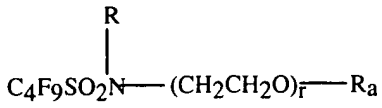


wherein

~~~~ represents a bond in a polymer chain;

R_f is $-C_4F_9$ or $-C_3F_7$;

R, R_1, R_2 and R_a are each independently hydrogen or alkyl groups having 1 to 4 carbon atoms;

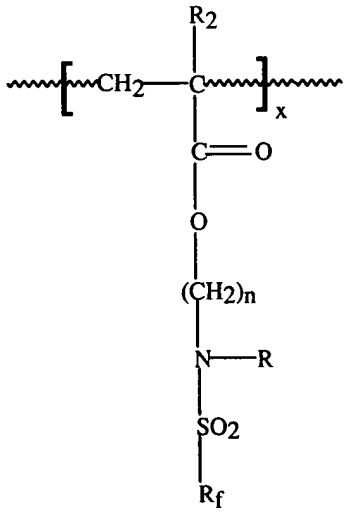
R_3 comprises one or more straight or branched polyalkylene-oxy groups having 2 to 6 carbon atoms in each group;

n is an integer from 2 to 10;

x, y and z are integers of at least 1; and

r is an integer of 2 to 20.

2. The ink composition of Claim 1, wherein the fluorochemical surfactant comprises one or more polymeric surfactants having a polymer chain comprising one or more units:



wherein
~~~~

R_f is $-C_4F_9$ or $-C_3F_7$;

R and R_2 are each independently hydrogen or alkyl groups having 1 to 4 carbon atoms;

n is an integer from 2 to 10; and

x is an integer of at least 1.

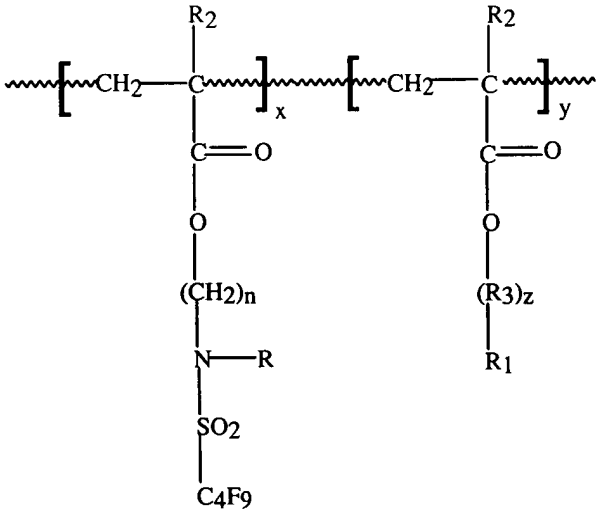
3. The ink composition of Claim 2, wherein

R_f is $-C_4F_9$;

R and R_2 are each independently hydrogen or methyl groups; and

n is 2.

4. The ink composition of Claim 1, wherein the fluorochemical surfactant comprises one or more polymeric surfactants having a polymer chain comprising one or more units:



wherein

R, R_1 and R_2 are each independently hydrogen or alkyl groups having 1 to 4 carbon atoms;

R_3 comprises one or more straight or branched polyalkylene-oxy groups having 2 to 6 carbon atoms in each group;

n is an integer from 2 to 10; and

x, y and z are integers of at least 1.

5. The ink composition of Claim 4, wherein R_3 comprises

$$(EO)_p\text{-}(PO)_q\text{-}(EO)_p$$

or

$$(PO)_q\text{-}(EO)_p\text{-}(PO)_q$$

wherein p is an integer of 1 to about 128 and q is an integer of 0 to about 54.

6. The ink composition of Claim 5, wherein R_3 comprises

$$(PO)_q\text{-}(EO)_p\text{-}(PO)_q$$

wherein p is about 17 and q is 0.

7. The ink composition of Claim 5, wherein R_3 comprises

$$(EO)_p\text{-}(PO)_q\text{-}(EO)_p$$

wherein p is an integer of about 14 to about 128 and q is an integer of about 9 to about 54.

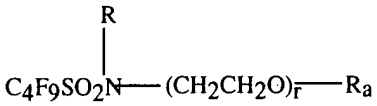
8. The ink composition of Claim 5, wherein p is an integer of about 7 to about 128 and q is an integer of about 21 to about 54.

9. The ink composition of Claim 8, wherein p is about 11 and q is about 21.

10. The ink composition of Claim 9, wherein the polymer chain does not comprise any other monomeric units.

11. The ink composition of Claim 5, wherein the polymer chain further comprises units derived from maleic anhydride, acrylonitrile, vinyl acetate, vinyl chloride, styrene, methyl acrylate, methyl methacrylate, ethylene, isoprene, butadiene, or combinations thereof.

12. The ink composition of Claim 1, wherein the fluorochemical surfactant comprises one or more surfactants having a chemical structure



wherein

R and R_a are each independently hydrogen or alkyl groups having 1 to 4 carbon atoms; and

r is an integer of 2 to 20.

13. The ink composition of Claim 12, wherein R and R_a are each independently methyl and r is an integer from 4 to 10.

14. The ink composition of Claim 1, wherein the vehicle is nonaqueous.

15. The ink composition of Claim 1, wherein the vehicle comprises a polymerizable material.

16. The ink composition of Claim 15, wherein the polymerizable material is free-radically polymerizable.

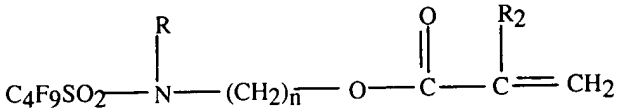
17. The ink composition of Claim 16, wherein the free-radically polymerizable material comprises at least one of an acrylate monomer and an acrylate oligomer.

18. The ink composition of Claim 1, wherein the vehicle is aqueous.

19. The ink composition of Claim 18, further comprising at least one of a humectant, and a colorant stabilizer.

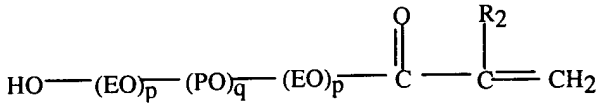
20. The ink composition of Claim 1, wherein the fluorochemical surfactant comprises a reaction product of:

(a) at least one compound having a formula

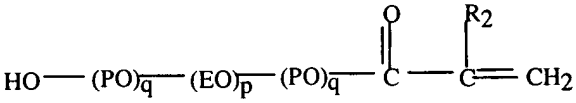


;

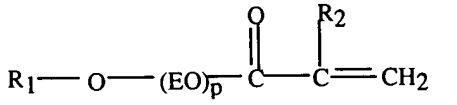
(b) at least one compound selected from the group consisting of



;

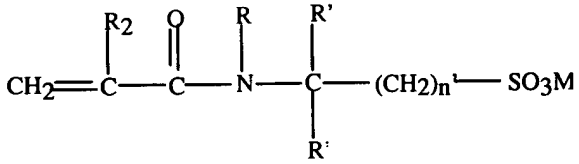


; and



; and optionally

(c) at least one compound having a formula



wherein

R, R_1, R' and R_2 are each independently hydrogen or an alkyl group having from 1 to 4 carbon atoms;

n is an integer from 2 to 10;

n' is an integer of 1 to 10;

p is an integer of 1 to about 128;

q is an integer of 0 to about 54; and

M is hydrogen, a metal cation, or a protonated tertiary amine.

21. The inkjet ink composition of Claim 1, wherein the ink composition has a Foam Stability Test value of less than about 30%.

22. The inkjet ink composition of Claim 21, wherein the ink composition is free of silicone-containing surfactants and defoamers.

23. A method of ink jet printing comprising ejecting the ink composition of Claim 1 from an ink jet printer head onto a substrate.

24. The method of Claim 23 further comprising the step of exposing the printed ink to actinic radiation.

25. The method of Claim 24, wherein the actinic radiation comprises ultraviolet radiation.

26. An article of manufacture comprising a substrate printed according to the method of Claim 23.

27. The article of Claim 26, wherein the substrate comprises wood, metal, paper, woven fabric, nonwoven fabric, leather, resin-coated paper, foil, a foam, a polymer film, or a combination thereof.

28. The article of Claim 27, wherein the substrate comprises single and multilayer nonporous polymer films of poly(vinyl chloride), polybutylene terephthalate, polyethylene terephthalate, acrylonitrile-butadiene-styrene copolymer, polystyrene, polycarbonate, polyurethane, epoxy, polyimide, polyamide, polymethyl (meth)acrylate, polyolefin,

polyamideimide, polyacrylate, polyacrylamide, melamine resins, polyvinyl butyral and copolymers thereof, and combinations thereof.

29. The article of Claim 27, wherein the substrate comprises single and multilayer constructions of paper, cardboard, non-woven fabric, woven fabric, leather, microporous film, and combinations thereof.

30. The article of Claim 26, wherein the article comprises a component for an outdoor sign, a roadway, a motor vehicle, a boat, an aircraft, or furniture.

31. The article of Claim 30, wherein the article comprises a retroreflective article.

32. The article of Claim 31, wherein the substrate comprises polymethyl methacrylate.

33. An ink jet printable radiation curable composition comprising:

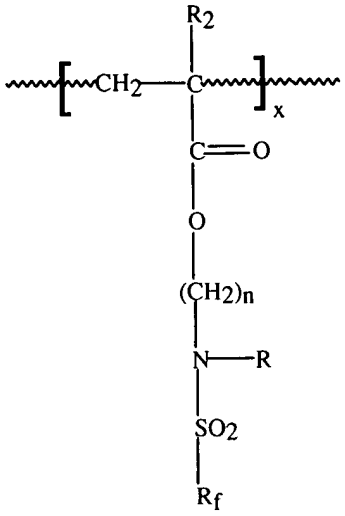
a vehicle comprising a polymerizable material;

a photoinitiator; and

a fluorochemical surfactant;

wherein no colorant is present; and

further wherein the fluorochemical surfactant comprises one or more surfactants having one or more chemical structures selected from:



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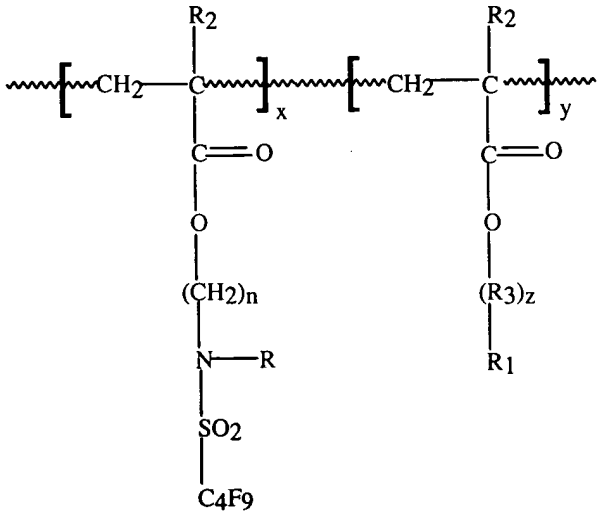

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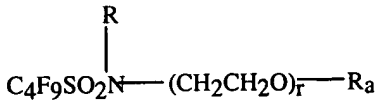

wherein

~~~~ represents a bond in a polymer chain;

R_f is $-C_4F_9$ or $-C_3F_7$;
~~~~

R, R_1, R_2 and R_a are each independently hydrogen or alkyl groups having 1 to 4 carbon atoms;

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x, y and z are integers of at least 1; and

r is an integer of 2 to 20.